AIRASSURE™ INDOOR PM2.5 MASS CONCENTRATION MONITOR

MODEL IPM2.5-AD

OPERATION AND SERVICE MANUAL

P/N 6008418, REVISION C
AUGUST 2015

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Manual History

The following is a history of the AirAssure™ Indoor PM2.5 Mass Concentration Monitor Model IPM2.5-AD Operation and Service Manual.

Revision	Date
A	December 2014
B	February 2015
C	August 2015

Warranty

Part Number 6005887 / Revision C / August 2015

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Service Policy Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI at 1-800-874-2811 (USA) or 651-490-2811.

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Safety

This chapter provides instructions to promote safe handling and correct operation of the AirAssure™ monitor.

All repair and maintenance of the AirAssure monitor should be done by qualified, trained technicians. All maintenance and repair information in this manual is included for use by a qualified, trained technician.

W A R N I N G
The AirAssure monitor must be used in the manner described in this manual. Failure to follow all of the procedures described in this manual can result in serious injury to you or can cause irrevocable damage to the instrument.

Description of Safety Labels

This information explains the advisory and identification labels used on the instrument and in this manual to reinforce the safety features built into the instrument.

Caution Symbols

C a u t i o n
Caution means ***be careful.*** If you do not follow the procedures described in this manual you may damage the instrument. Caution also indicates important information about the operation and maintenance of this instrument.

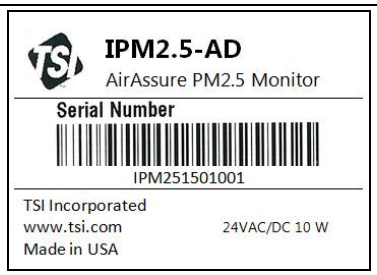
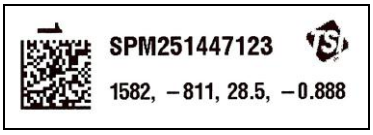
Warning Symbols

W A R N I N G
Warning means that unsafe use of the instrument could result in serious injury to you or cause irrevocable damage to the instrument. Follow the procedures prescribed in this manual to use the instrument safely.

W A R N I N G
Un-insulated voltage within the instrument may have sufficient magnitude to cause electric shock. It is dangerous to make any contact with any part inside the instrument.

Labels

Advisory labels and identification labels are attached to the interior and exterior of the AirAssure monitor. Labels are described below.

Back Panel Label—displayed on the back panel.	
Sensor Element Label (internal)—inside the front cover	

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CHAPTER 1

Product Overview

This chapter contains an introduction to the Model IPM2.5-AD AirAssure™ Monitor and provides a brief explanation of instrument operation.

Product Description

The AirAssure monitor is a mass concentration measuring device that mounts to a wall and continuously measures indoor PM2.5 concentrations displaying and controlling particulate pollution in indoor environments.

The AirAssure monitor is typically used to monitor air quality in “Grade A” commercial offices, government buildings, hospitals, private schools, and high-end residences that want to provide controlled, regulated indoor air quality for employees and residents.

Figure 1-1
AirAssure Mass Concentration Monitor

Features

- 4.3” color LCD display that is easy to read from across the room
- Languages: Simplified Mandarin, English
- Range of measurement: 5–300 µg/m^3
- Calibrated with professional instruments for accuracy
- Large, easy-to-read display with readings that change colors to signify changes in air quality
- Easy to install
- Low maintenance with no batteries to replace
- Analog output to communicate with building control system that updates every second
- Ethernet digital output and web application used to extract and store data for viewing on a monitor using a web application that updates every 5 minutes
- Web application controls up to 99 instruments from 1 server, identifies problem areas in building, and updates monitor configuration
- Built-in autozero mechanism periodically zeroes instrument for sustained accuracy over time
- Mounts to drywall, type 86 gang box, or American single gang box
- Field serviceable components

How it Works

The AirAssure monitor incorporates a photometer with light-scattering technology to closely estimate particulate mass concentrations.

The monitor measures particles less than roughly 2.5 micrometers in diameter (PM2.5). Regular air quality readings provide employees and building occupants' assurance that the indoor environment is at an acceptable level for human health.

The monitor can be either mounted flush into drywall or to a gang box using the included adapter plate.

There are three ways that the AirAssure monitor can provide data:

1. Display only – only the power connection is required for the unit to display readings on the display for use by anyone walking nearby. The display is large and colorful, making it easy to read from a long distance.
2. Analog output – for use with building automation systems that accept 4-20 mA input. The 4-20 mA output can be connected to a pre-existing building automation system and configured to show from <5 to 300 µg/m^3 output over the 4-20 mA output range.
3. Ethernet output – for use with AirAssure Web, a custom TSI web application. A standard Ethernet output can connect up to 99 devices on a local area network to a software application running on a computer on the same network. The custom application allows monitoring and configuration of the sensors remotely. AirAssure Web data is archived, and can be downloaded and imported into a spreadsheet program such as Microsoft Excel® spreadsheet program for offline analysis.

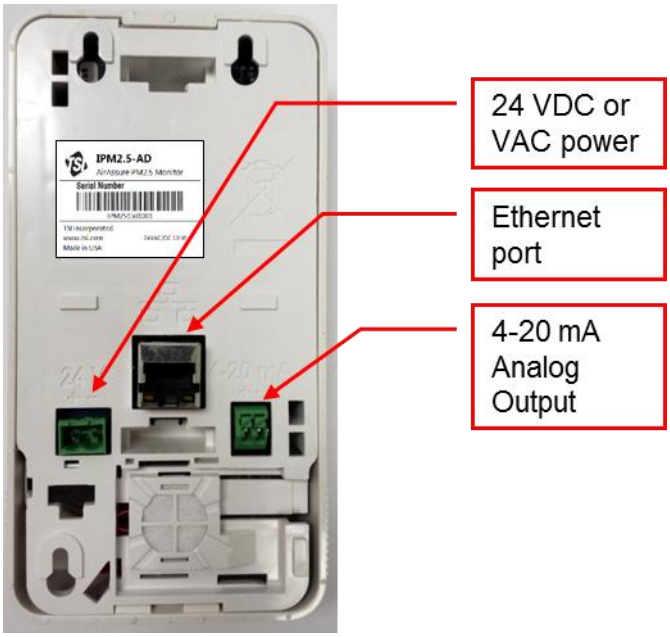

Figure 1-2
AirAssure Monitor Back Panel Ports

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CHAPTER 2

Unpacking

Packing List

The packing list described in Table 2-1 lists the components shipped with the AirAssure™ monitor.

Table 2-2 lists the AirAssure service kits available from TSI. The service kits are sold separately.

Table 2-1
AirAssure Monitor Packing List

Qty.	Description
1	IPM2.5-AD AirAssure PM2.5 Indoor Particle Monitor and 24 V connector
1	Optional wall plate
1	Mounting hardware (3 drywall screws, 3 drywall plugs, 2 gang box screws, one 6 mm screw)
1	NIST Statement of conformance
1	Quick Start Guide

Table 2-2
AirAssure Monitor Service Kits

Qty.	Part Number	Description
1	IPM2.5-Sens	Calibrated sensor element
1	IPM2.5-Kit	Replacement pump, fan, and filter

Unpacking

Use the Packing List in Table 2-1 to verify that there are no missing components.

If anything is missing, or appears to be damaged, contact a TSI representative or TSI Customer Service using one of the following methods:

Telephone: 86 10 8219 7688 (China)
1-800-874-2811 (within the US)
001-651-490-2811 (outside the US and China)

E-mail: technicalservice@tsi.com.

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CHAPTER 3

Hardware Installation

The AirAssure™ monitor can be mounted to either drywall or to a switch box (Type 86 gang box or American single gang box). When mounting to a switch box or when covering up a larger-than-needed hole, the wall plate accessory can be used. The wall plate accessory is shipped with the monitor.

Prior to installation, the cable connections should be prepared and accessible at the desired wall-mount location.

IMPORTANT

- Before selecting a mounting option, check local codes and regulations to verify if a gang box is required.
- The AirAssure monitor requires 24 VAC or VDC. If the installation location has only 220 VAC, then a transformer is needed. This transformer can be purchased from a local supplier.

Drywall Mount

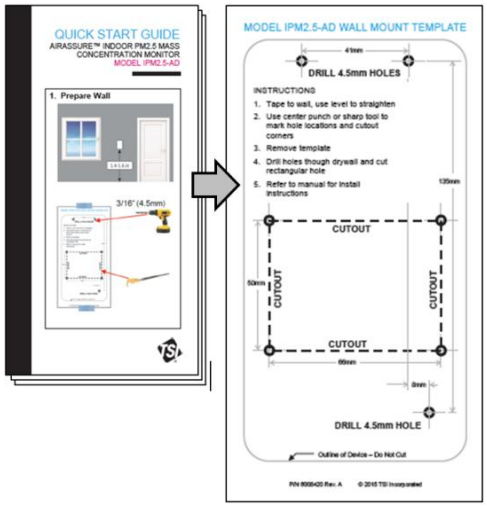
Tools required for installing into Drywall:

- Wire stripper
- Flat head screw driver
- Phillips head screw driver
- Level
- Drill
- Pencil
- Wallboard saw
- Notepad to record serial numbers

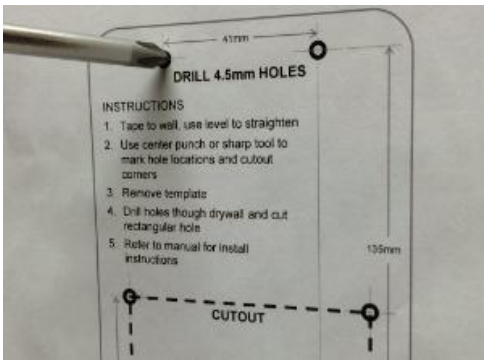
Before Starting

If you plan to use the analog output or Ethernet with a building automation system or with the TSI AirAssure Web software, it will be helpful to record the serial number, physical location, and IP address for each sensor in Table 3-1 at the end of this chapter. The serial number is located on the back of the unit, below the bar code.

1. Locate the wall-mount template, located in the Quick Start guide. Remove the template from the Quick Start guide.
2. Tape template to wall in the desired location, using a level to straighten. Recommended mounting height is 1.4 to 1.6 meters from the floor.

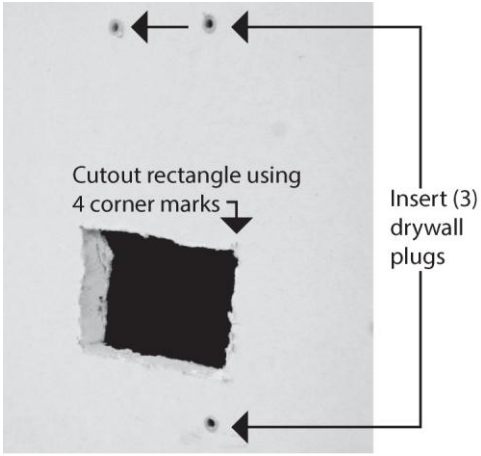


3. Locate the three (3) mounting hole marks on the template and the four (4) corners of the rectangular cutout.
4. At each location, use a pencil or sharp tool to poke through the template and mark desired position on the wall.
5. Remove template.


41mm
DRILL 4.5mm HOLES
INSTRUCTIONS
1. Tape to wall, use level to straighten
2. Use center punch or sharp tool to mark hole locations and cutout corners
3. Remove template
4. Drill holes though drywall and cut rectangular hole
5. Refer to manual for install instructions
135mm
CUTOUT

6. At each mounting location, drill three (3) 4.5 mm holes through the drywall.

7. Cut a rectangular hole in drywall using the wall cutout corner marks on the template.
8. Insert the provided drywall plugs into the three (3) mounting locations. Ensure plugs are fully seated by tapping with a hammer.
9. Fasten the provided 25 mm screws into drywall plug and screw into drywall leaving approximately 3 mm space between the plug and the screw head.



10. Pull cables through hole in drywall.
11. Remove 24 V screw terminal connector from the back of the unit.

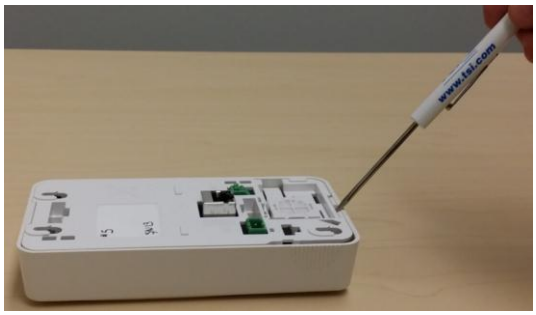
C a u t i o n

Verify that polarity matches the polarity shown on the back of the unit. Incorrect polarity may damage unit.

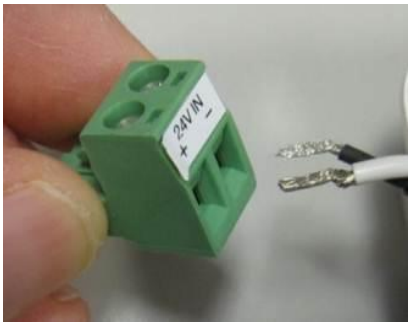
C a u t i o n

The power input must be wired to 24 VAC or 24 VDC. Wiring the unit to 120/230 VAC will cause serious damage to the unit and void the warranty.

12. Use a flathead screwdriver to separate the cover from the base. The slot is located on the back of the unit along the bottom seam between the unit cover and base.

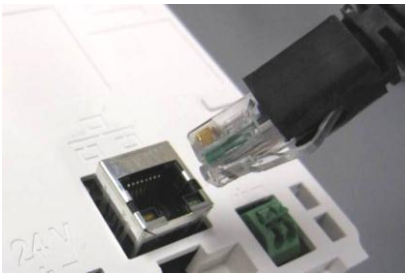


13. Insert stripped leads from building 24 V power cable into screw terminal connector and tighten screws on terminal.



14. Insert connector into the unit.

15. Connect Ethernet if digital connection is desired.



16. Connect 4-20 mA if analog connection is desired. Wire is held in place by depressing spring clip, inserting wire, and releasing spring clip.

17. Align monitor flush against the three (3) mounting screws and push downward onto screw heads.
18. Tighten mounting screws.
19. Place cover over the mounted display and snap the bottom of the cover to the base.
20. The monitor is ready for use and powers on when the 24 VAC/VDC connection is turned on.
21. Self-test: When the unit is first powered up, it performs a quick self-check by turning the pump on to give three (3) quick “chirps”. If an error occurs, it will display on the front panel as a -1, -2 or -3 within 30 seconds of powering up. See the table in Chapter 9 under Troubleshooting if one of these codes appears.

Gang Box Mount

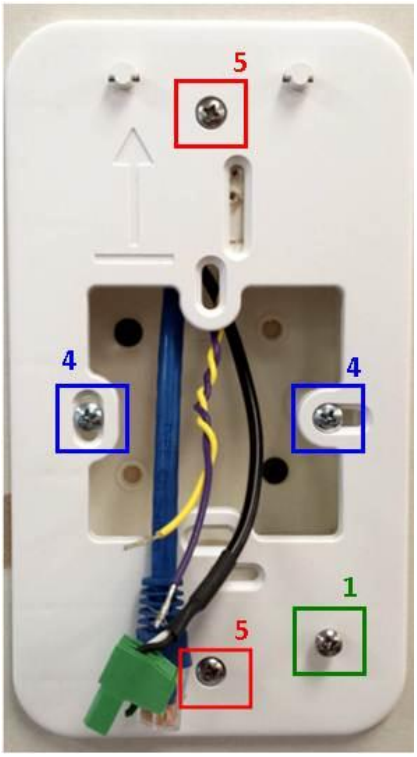
Tools required for installation into a Gang Box:

- Wire stripper
- Flat head screw driver
- Phillips head screw driver
- Level

Note

In cases where there is a gap between the gang box and wall plate, it is recommended that spacers be used to provide support for the wall plate. Gang box spacers can be obtained from a local hardware supplier.

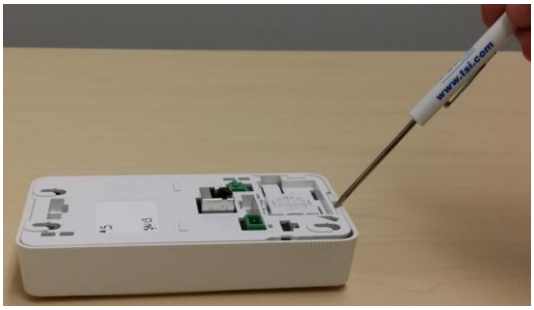
1. Insert the short 6-mm self-tapping screw into the plate. The back of the screw should be flush with the back of the plate.
2. Place optional wall plate up to the gang box.
3. Pull cables through the wall plate opening.
4. Fasten the wall plate to the gang box using the two (2) provided 20-mm M4 screws.
5. Further secure the plate into the drywall using the two (2) provided 25-mm screws and drywall anchors. If mounting to masonry or other hard surface, install screws appropriate for that surface.
6. Remove green connector labeled **"24V IN"** from the back of the device.
7. Insert stripped leads from building 24 V power cable into screw terminal connector and tighten screws on terminal.



Caution

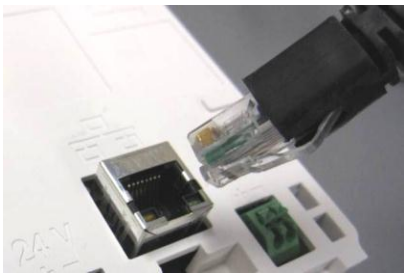
Verify that 24 V power polarity matches the polarity on the back of the unit. Incorrect polarity may damage unit.

8. Use a flathead screwdriver to separate the cover from the base. The slot is located on the back of the unit along the bottom seam between the unit cover and base.

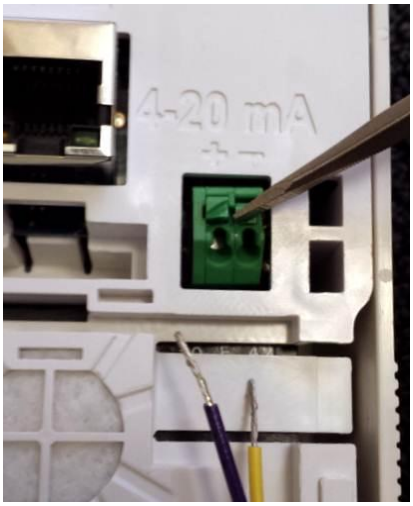


9. Insert 24 V connector into unit.

10. Connect Ethernet if digital connection is desired.



11. Connect 4-20 mA if analog connection is desired. Wires are held in place by depressing spring clips, inserting wires, and releasing the spring clips.



12. Slide the unit base downward on to the wall plate to fasten to wall plate hooks.
13. Tighten the lower-right mounting screw to secure the unit to the wall plate.

14. When the unit is secure, place the cover over the mounted display and snap the bottom of the cover to the base.
15. The monitor is ready for use and powers on when the 24 VAC/VDC connection is turned on.
16. Self-test: When the unit is first powered up, it performs a quick self-check by turning the pump on to give three (3) quick “chirps”. If an error occurs, it will display on the front panel as a -1, -2 or -3 within 30 seconds of powering up. See the table in Chapter 9 under Troubleshooting if one of these codes appears.

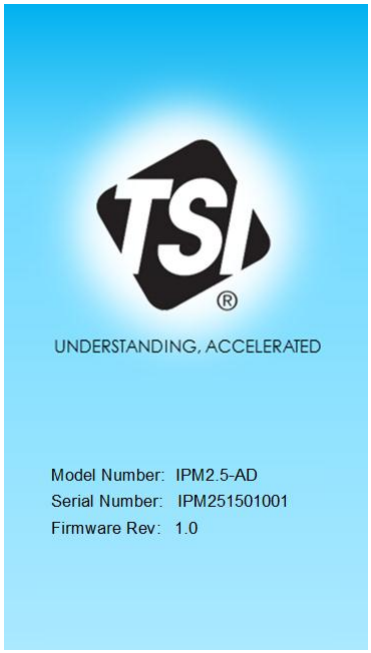
Table 3-1
Reference Table for Sensor Configurations

Serial number (e.g. IPM251501002)	IP Address (e.g. 192.168.11.5)	Description (e.g. Accounting, Floor 5, Northeast)

CHAPTER 4

AirAssure Monitor Operation

At power-up, a splash screen displays with the TSI logo, model number, serial number, and firmware version.



Color bar indicates range and progression through the color codes (4 bars per color except for maroon, which has 1 bar)

The monitor's display indicates PM2.5 concentration in units of µg/m^3. This value is a 5-minute trailing average, and updates once per second.

The air quality index (AQI) color changes depending on the PM2.5 concentration.

When the monitor is connected to a network, the IP address will be shown in the lower left-hand corner of the display.

Air Quality Index Reading

As air quality fluctuates beyond the good limit range, the color shown on the display changes to reflect the severity of the change. The AirAssure monitor uses the China air quality index (AQI) standard, which is based on the recommendations of the World Health Organization (WHO) from 2005.

Six AQI categories and PM 2.5 value ranges can display on the monitor.

Error Conditions

If a negative number appears on the display, this indicates an error condition.

The error codes are as follows:

Error Code	Description	Cause
-1	Sensor Error	Sensor element is damaged or needs replacement.
-2	Autozero Error	Pump is not turning on or there is a leak around the filter.
-3	Fan Error	Fan is damaged or needs replacement.

Refer to the Troubleshooting section of the manual for other causes and recommended actions.

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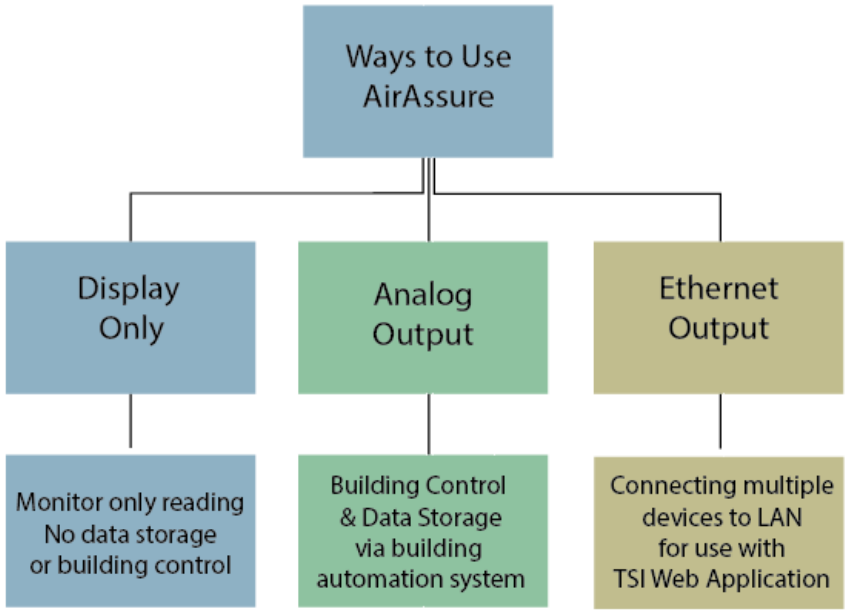
CHAPTER 5

Setup Overview

The AirAssure™ monitor provides data in three ways:

1. Display only – only the power connection is required for the unit to display readings on the display for use by anyone walking nearby. The display is large and colorful, making it easy to read from a long distance.
2. Analog output – for use with building automation systems that accept 4-20 mA input. The 4-20 mA output can be connected to a pre-existing building automation system and configured to show from <5 to >300 µg/m^3 output over the 4-20 mA output range.
3. Ethernet output – for use with AirAssure Web, a custom TSI web application. A standard Ethernet output can connect up to 99 devices on a local area network to a software application running on a computer on the same network. The custom application allows monitoring and configuration of the sensors remotely. AirAssure Web data is archived, and can be downloaded and imported into a spreadsheet program such as Microsoft Excel® spreadsheet program for offline analysis.


Ways to Use AirAssure
Display Only
Analog Output
Ethernet Output
Monitor only reading No data storage or building control
Building Control & Data Storage via building automation system
Connecting multiple devices to LAN for use with TSI Web Application

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CHAPTER 6

Analog Output

The 4-20 mA current loop is a very robust sensor signaling standard used commonly in building automations systems. Current loops are ideal for data transmission because of their inherent insensitivity to electrical noise. The current provided by the analog output from 4-20 mA is linearly proportional to the reading on the front of the display.

4-20 mA Setup

Refer to Chapter 3 for hardware installation instructions. The electrical connections required for use of the analog output are:

- 24 VAC/VDC power
- 4-20 mA dual conductor connection to building automation system

Note that the connectors are different for these two connections.

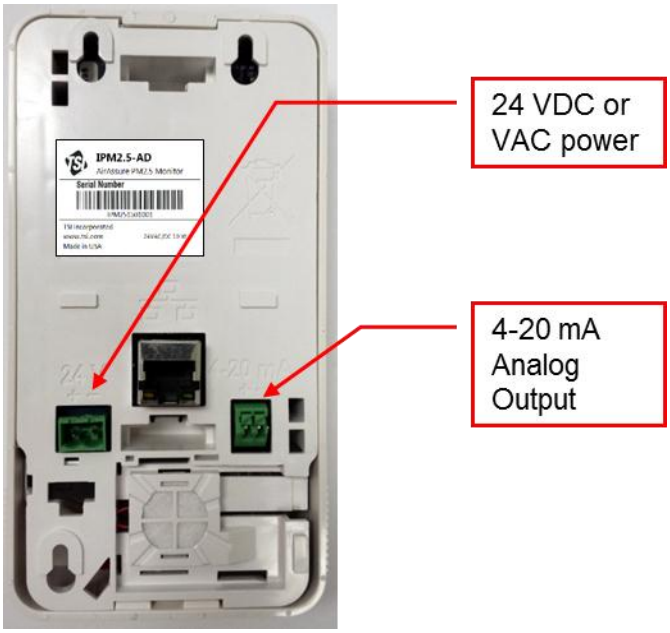


Figure 6-1
AirAssure Monitor Back Panel Power and Analog Output Connections

Please consult the documentation for your particular building automation system for how to connect a sensor to the system and any special requirements for that system. Also refer to the building automation system documentation and the table and formula below to configure the system for

this sensor type. A maximum cable length of 300 meters is recommended to avoid excessive loss of voltage.

Typically a system is configured within the building automation software by a technician to convert the signal into a meaningful measurement.

If your building automation system accepts only a voltage input then a load resistor will be needed. Recommended load resistor specifications are as follows:

- 0-5V: >0.25W, 250Ω ±0.1%, <25 PPM temp coefficient
- 0-10V: >0.33W, 500Ω ±0.1%, <25 PPM temp coefficient

Table 6-1 provides some examples of conversions based on the formula below.

Table 6-1
Conversion from 4-20 mA Signal to PM2.5 Measurement

Signal (mA)	Measurement ($\mu g/m^3$)
4	0
5	19
10	113
15	206
20	300 (or more)

The conversion formula is as follows:

Measurement = (300-5)/(20-4)*(Signal-4)

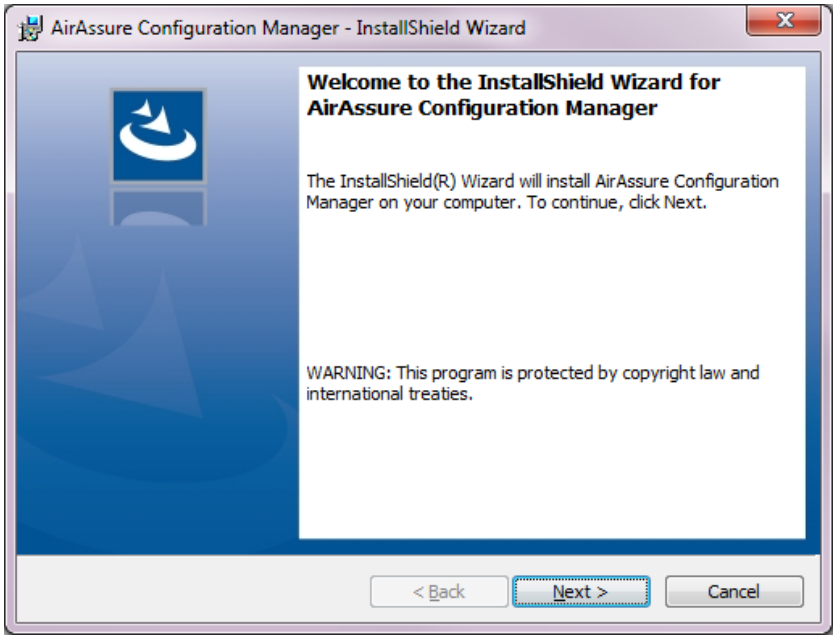
AirAssure Configuration Manager

Ethernet is typically used to adjust calibration parameters or configure IP settings. However, if you need to configure the monitor but are not using Ethernet, *AirAssure Configuration Manager* can be used to configure the device over USB. The USB connection is located inside of the device.

W A R N I N G
Procedures described in this section should only be performed by a qualified, trained service technician.

Follow these steps to download *AirAssure Configuration Manager:*

1. Download *AirAssure Configuration Manager* from http://www.tsi.com/airassure-get-started.
2. Run the setup file.


AirAssure Configuration Manager - InstallShield Wizard
Welcome to the InstallShield Wizard for AirAssure Configuration Manager
The InstallShield(R) Wizard will install AirAssure Configuration Manager on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

Follow these steps to connect to monitor:

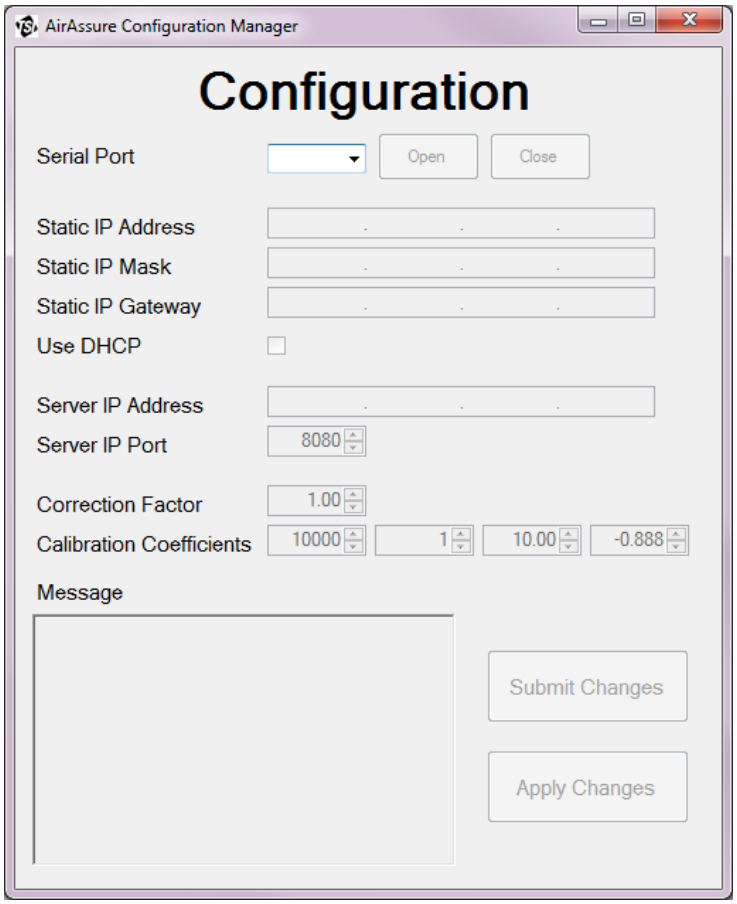
1. Before opening *AirAssure Configuration Manager* you must connect USB. To access the USB connector, remove the cover of the monitor by pressing fingers firmly on bottom of device cover, squeeze, and pull outwards.

2. Connect the unit to a personal computer using a Micro USB cable (not provided). The USB connector is on the left-hand side of the device.

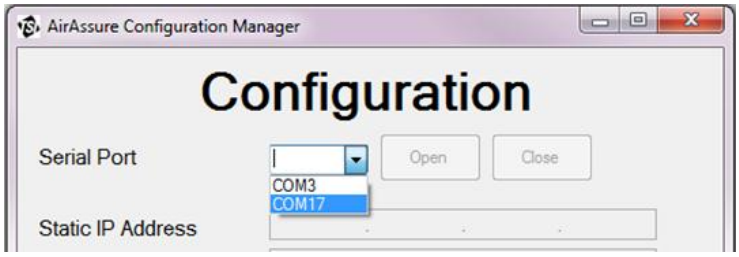
Caution
Use caution when plugging in cable, as excessive perpendicular force may damage the connection.

3. Open up *AirAssure Configuration Manager* on your personal computer.

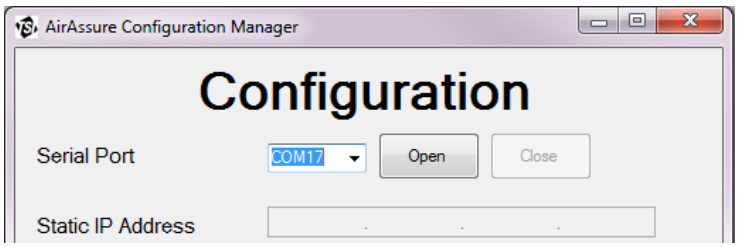
4. After the splash screen, the *AirAssure Configuration Manager* main page will appear.



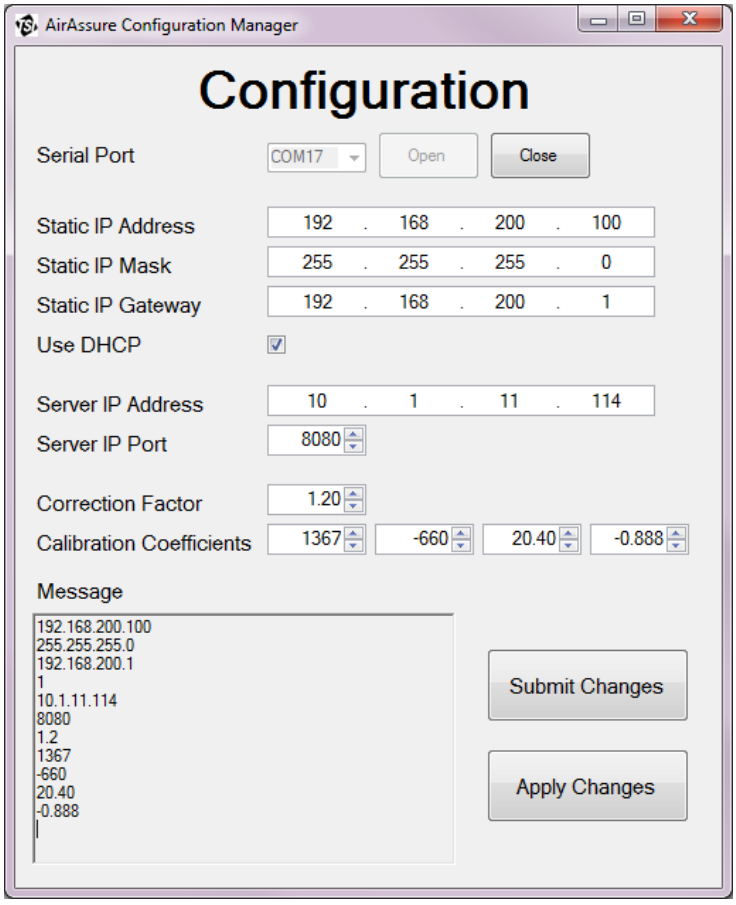
5. Click the **Serial Port** drop-down arrow and select the COM port connected to the IPM2.5-AD AirAssure™ monitor. If there are multiple COM ports listed, the highest COM port is usually the most recently added AirAssure monitor.



6. Click the **Open** button to connect to the monitor.



7. You are now connected to the IPM2.5-AD AirAssure™ monitor. From this screen, you can configure IP settings, update the correction factor, or modify the calibration coefficients when installing a new sensor element.



Please refer to Chapter 7 for details about how to configure IP settings, and refer to Chapter 9 for details about how to install a new sensor element and update calibration coefficients.

CHAPTER 7

Network/Ethernet Setup

Up to 99 Model IPM2.5-AD AirAssure™ monitors can be configured on a local area network with the TSI AirAssure Web application running on a computer on the same network. The custom application allows monitoring and configuration of the sensors remotely. AirAssure Web data is archived, and can be downloaded and imported into a spreadsheet program such as Microsoft Excel® for offline analysis.

Five steps are required to establish an Ethernet connection:

1. Install the Web Application.
2. Obtain the IP address for the server/computer that the web application will reside.
3. Configure each monitor with the IP address of the server computer.
4. Open the AirAssure Web Application to view and control the monitors.

Note

Recommended browsers include Internet Explorer® Version 10 and higher, Chrome, Safari, and Android. Recommended operating systems are Windows® 7 and Windows® 8.1. Use of other browsers or operating systems may limit functionality or prevent access to the webpage or web application.

Install the Web Application

There are seven steps to configuring the system for Ethernet output for use with the TSI custom web application. Follow the outline below. There are more details for each step below.

1. Download the installation package from: http://www.tsi.com/airassure-get-started.
2. Install Java® 8 on a computer/server connected to an Ethernet network using jre-8u20-windows-x64.exe for 64bit computers or jre-8u20-windows-i586.exe for 32 bit computers. To prevent problems with changing IP address, it is strongly recommended that the computer/server has a fixed address.
3. Install Apache Tomcat on the computer/server.
4. Load the web application file from Tomcat (pmweb.war).
5. Physically install the sensors on the Ethernet network.

6. Open the web page for each sensor and configure the web page on each sensor to send data to the web application.
7. Open the web application and configure the data and sensor labels.

Install Java® 8

All Java® application servers require a Java® virtual machine. The vendor and version of Java® required depends on the application server chosen. Java® 8 or higher is recommended.

The reference platform and instructions below use Oracle Java® 8u20 64-bit running on Windows® 7 64-bit Professional. Other platforms are compatible provided they have a Java® 7 or higher environment and Java® application server available. (Ubuntu 12.04 64-bit with Oracle Java® 7 and Apache Tomcat 7 has been tested for compatibility. In addition to the installation package, Java® 8 is downloadable directly from www.java.com.)

It is recommended before proceeding with online installation to disable your Internet firewall. In some cases the default firewall settings are set to reject all automatic or online installations such as the Java® online installation. If the firewall is not configured appropriately, it may stall the download/install operation of Java® under certain conditions. Refer to your specific Internet firewall manual for instructions on how to disable your Internet Firewall.

The installation medium contains Oracle Java® 8 JRE 32- and 64-bit for Windows. Run the installer following the installation prompts.

1. On the download page, click the **Download** button to start the installation process. The File Download dialog box appears prompting to run or save the download file.
   a. Click **Run** to run the installer.
   b. Click **Save** to save the file for later installation.
2. Choose the folder location and save the file to your local system.
3. Double click on the saved file to start the installation process. The installation process starts.

4. At the Java® Setup Welcome screen, click **Install**.

Java Setup - Welcome
Java
ORACLE
Welcome to Java
Java provides safe and secure access to the world of amazing Java content. From business solutions to helpful utilities and entertainment, Java makes your internet experience come to life.
Note: No personal information is gathered as part of our install process.
Click here for more information on what we do collect.
Click Install to accept the license agreement and install Java now.
Change destination folder
Cancel
Install >

5. Click **Close** at the final installation window.

Java Setup - Complete
Java
ORACLE
You have successfully installed Java
You will be prompted when Java updates are available. Always install updates to get the latest performance and security improvements.
More about update settings
The security level has been set to a minimum value of High.
More information
Close

N o t e
A restart (close and re-open) of the browser may be required to enable the Java® installation in your browser.

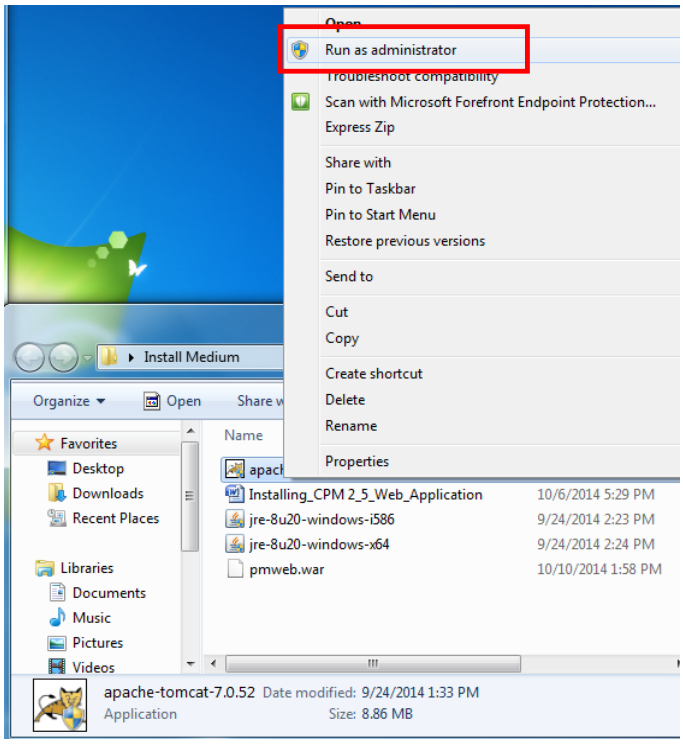
Install Apache Tomcat™ Application

Apache Tomcat™ Application Server/Servlet Container is an open source software implementation of the Java® Servlet and Java Server Pages technologies. Apache Tomcat™ is commonly used for both development and production and is part of the reference platform for the AirAssure Web Application.

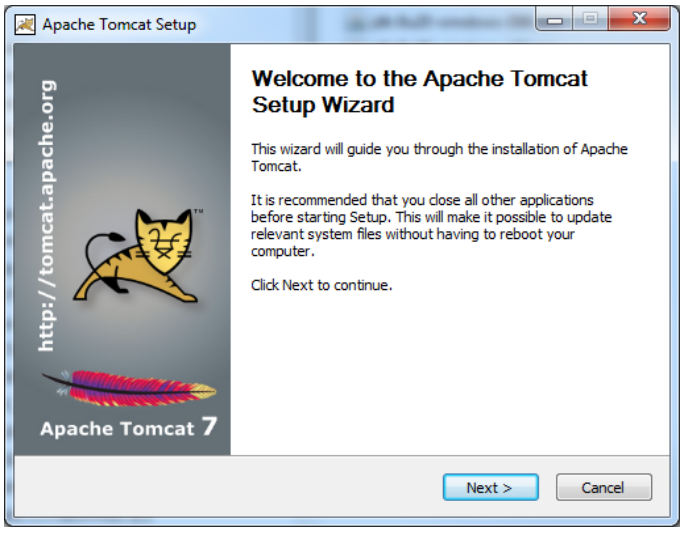
Installing Apache Tomcat™ Application

It is recommended that all open applications are closed before starting setup to eliminate a computer reboot.

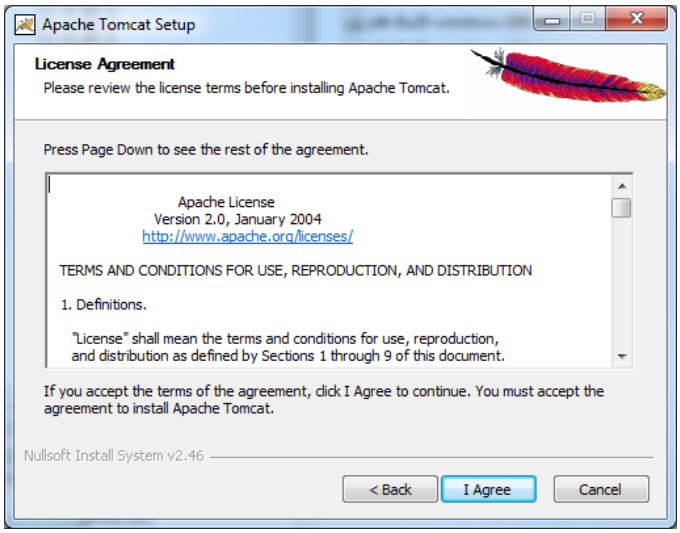
1. From the installation package, select **Tomcat 7.0.xx**, right-click and select "**Run as Administrator**".



2. At the Apache Tomcat™ Setup window, click **Next**.

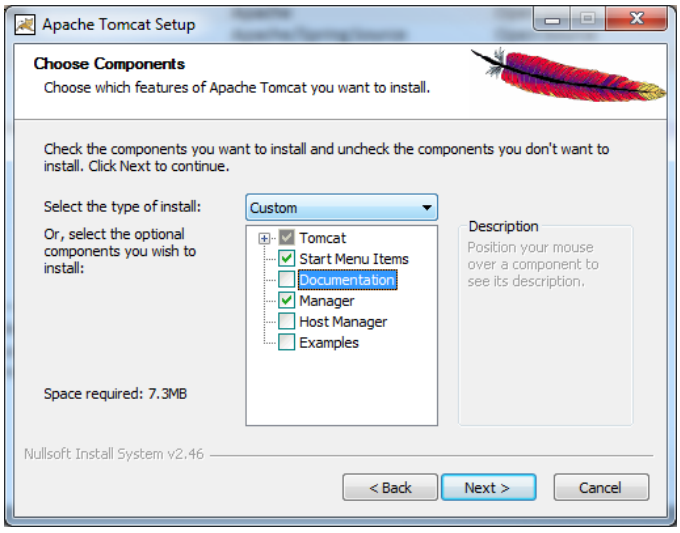

Apache Tomcat Setup
http://tomcat.apache.org
Apache Tomcat 7
Welcome to the Apache Tomcat Setup Wizard
This wizard will guide you through the installation of Apache Tomcat.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

3. Click **I Agree** button to accept license and proceed.


Apache Tomcat Setup
License Agreement
Please review the license terms before installing Apache Tomcat.
Press Page Down to see the rest of the agreement.
Apache License
Version 2.0, January 2004
http://www.apache.org/licenses/
TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION
1. Definitions.
"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install Apache Tomcat.
Nullsoft Install System v2.46
< Back
I Agree
Cancel

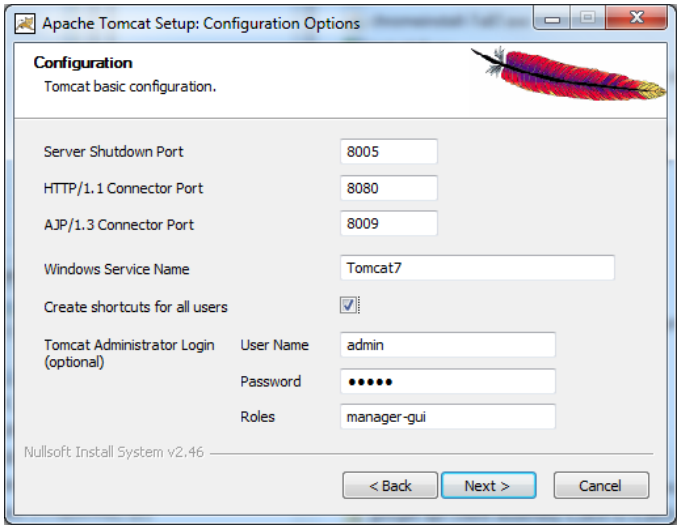
4. At the Choose Components window, select the type of components to install:
   a. Tomcat
   b. Start Menu Items
   c. Manager

5. Click **Next** to proceed.

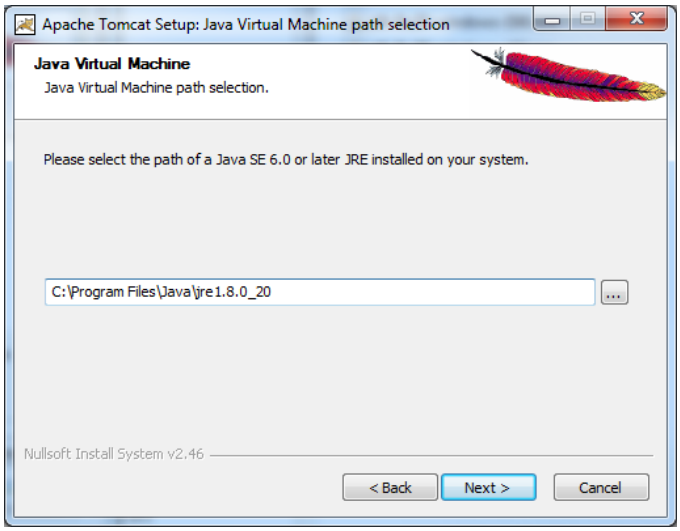

Apache Tomcat Setup
Choose Components
Choose which features of Apache Tomcat you want to install.
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select the type of install:
Custom
Or, select the optional components you wish to install:
Tomcat
Start Menu Items
Documentation
Manager
Host Manager
Examples
Description
Position your mouse over a component to see its description.
Space required: 7.3MB
Nullsoft Install System v2.46
< Back
Next >
Cancel

6. Enter application manager details at the Configuration window and click **Next**. Check the “Create shortcuts for all users” box. The user name and password used at this screen will be required again when installing Application Manager Interface. Record your username and password below for reference (admin and admin are common but not secure):

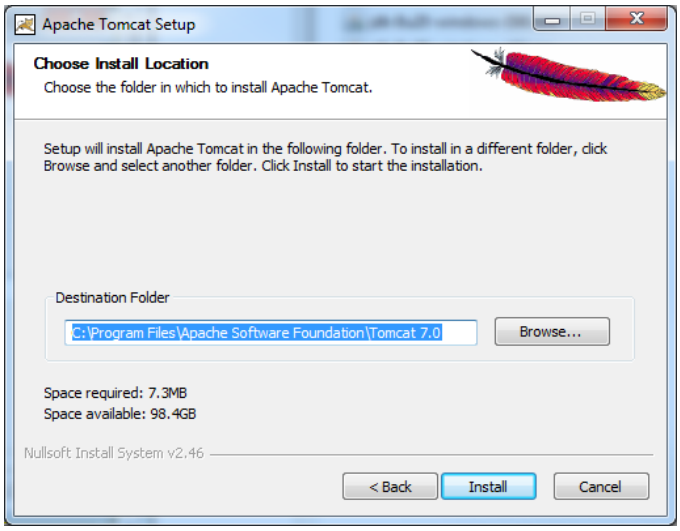
Username:	
Password:	



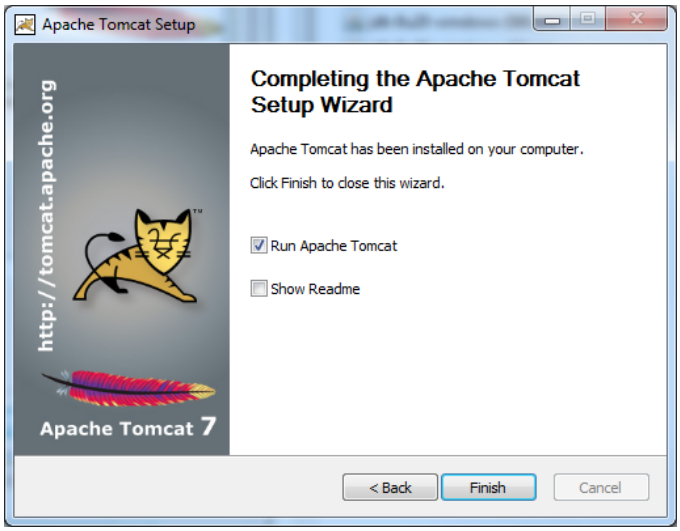
7. Select the path of a Java® JRE installed and click **Next**.


Apache Tomcat Setup: Java Virtual Machine path selection
Java Virtual Machine
Java Virtual Machine path selection.
Please select the path of a Java SE 6.0 or later JRE installed on your system.
C:\Program Files\Java\jre1.8.0_20
...
Nullsoft Install System v2.46
< Back
Next >
Cancel

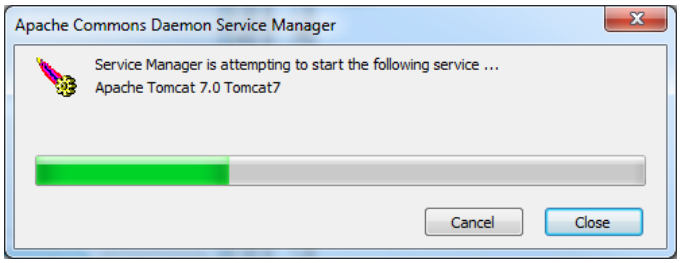
8. Select a destination folder and click **Install**.


Apache Tomcat Setup
Choose Install Location
Choose the folder in which to install Apache Tomcat.
Setup will install Apache Tomcat in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder
C:\Program Files\Apache Software Foundation\Tomcat 7.0
Browse...
Space required: 7.3MB
Space available: 98.4GB
Nullsoft Install System v2.46
< Back
Install
Cancel

9. Finalize setup by selecting “Run Apache Tomcat” and click **Finish**.

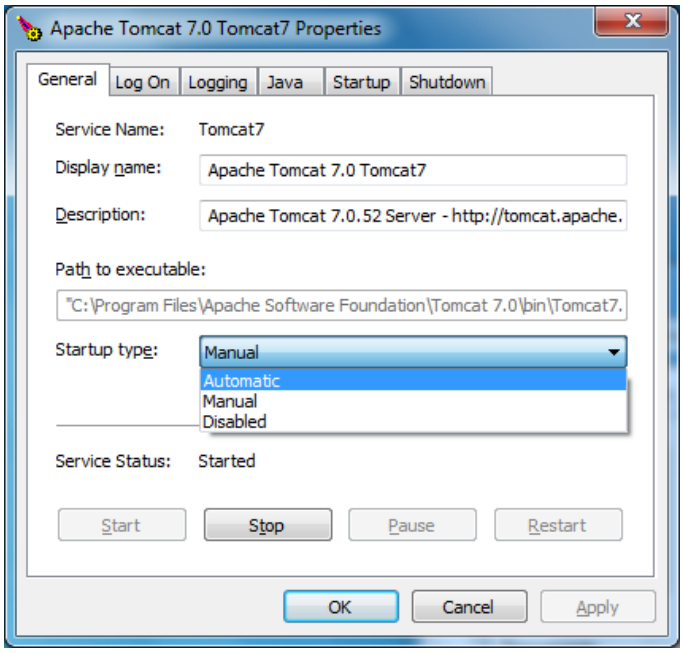


10. The Tomcat™ Application Server will start as a Windows® service.


Apache Commons Daemon Service Manager
Service Manager is attempting to start the following service ...
Apache Tomcat 7.0 Tomcat7
Cancel
Close

11. In the toolbar, double-click on the Tomcat™ server icon to open the configuration dialog box. Alternately, you can type “configure tomcat” in the search box and run the configuration.

12. Change the startup type from manual to automatic so that Tomcat™ will start up automatically if the computer is power cycled. Click **OK**.

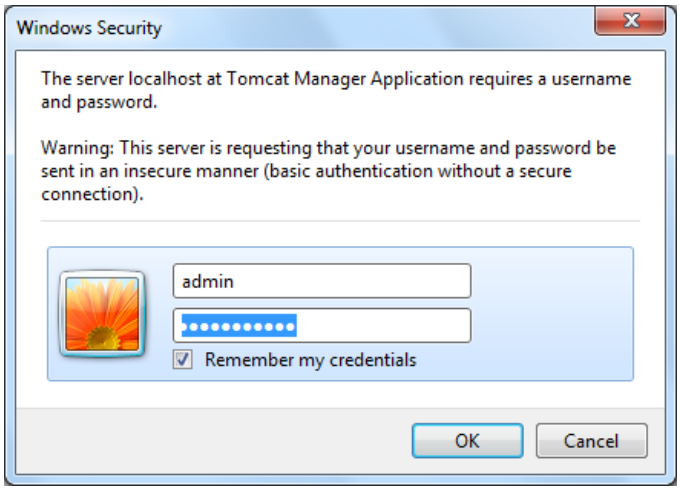


Apache Tomcat™ Application Manager Interface

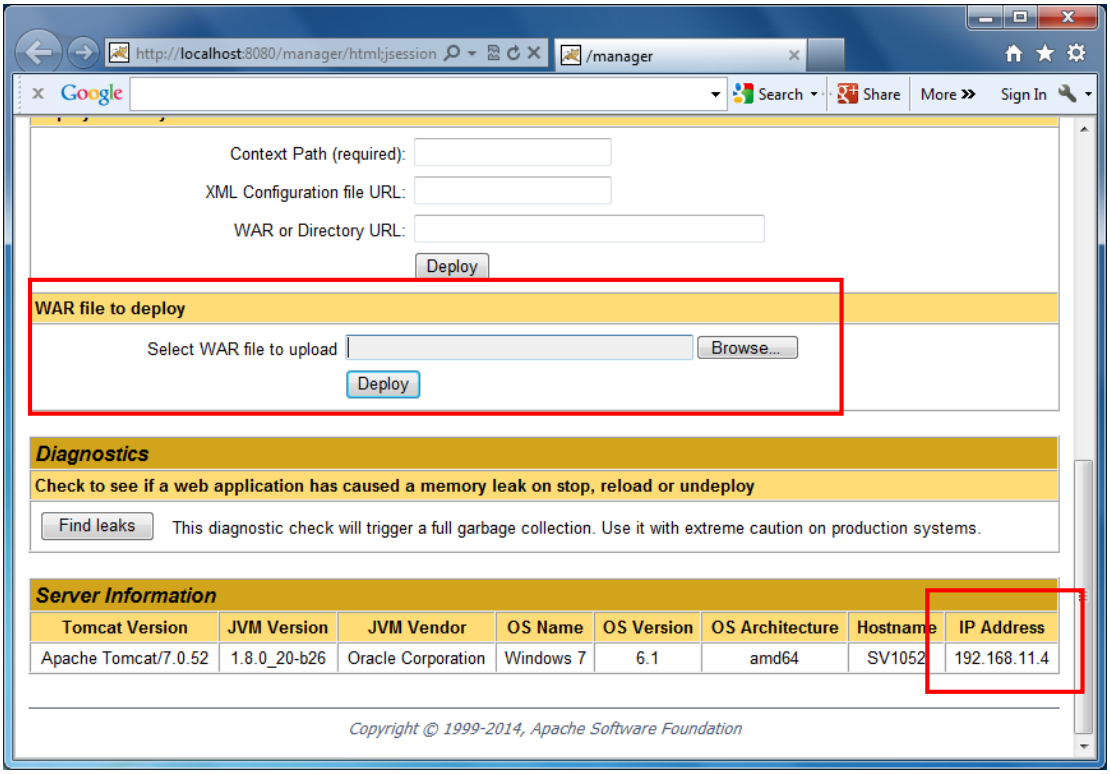
The web application for the AirAssure monitor is packaged as a Web Application Archive (.war) file. Apache Tomcat™ has an application manager interface to upload and control web applications. The installation medium folder contains the web application named pmweb.war.

To Install the Web Application:

1. Open a web browser and navigate to http://localhost:8080/manager or http://[IPADDRESS]:8080/manager, where [IPADDRESS] is the IP address of the server.
2. Enter the username and password recorded in step 6 above from installing Tomcat™ and click **OK**.


Windows Security
The server localhost at Tomcat Manager Application requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
admin
Remember my credentials
OK
Cancel

3. Under “WAR file to deploy”, click “Browse” and select **pmweb.war** from the installation medium.
4. Click **Deploy**.

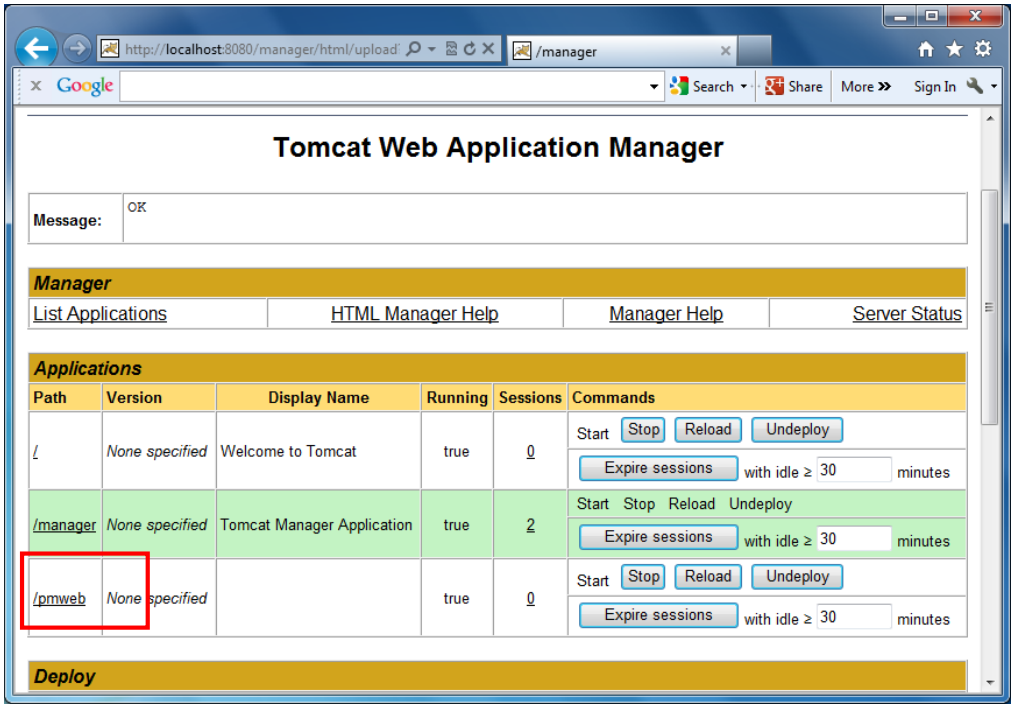


5. From the lower-right corner of the web page, record the Tomcat server IP address. You will need it later to configure each of the sensors.

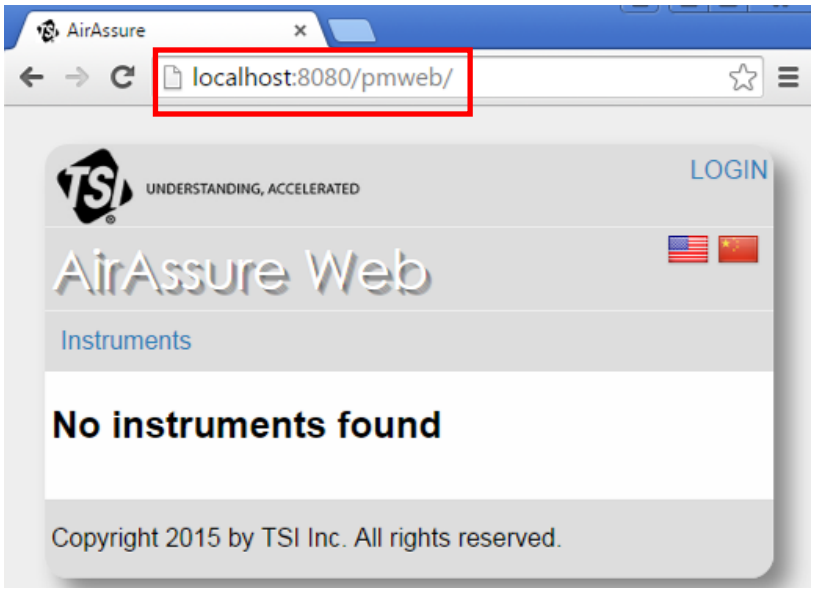
Tomcat Server IP Address:	

6. The web application is now installed and ready for use. The web page should refresh after a few seconds and add the /pmweb entry under applications as shown below.

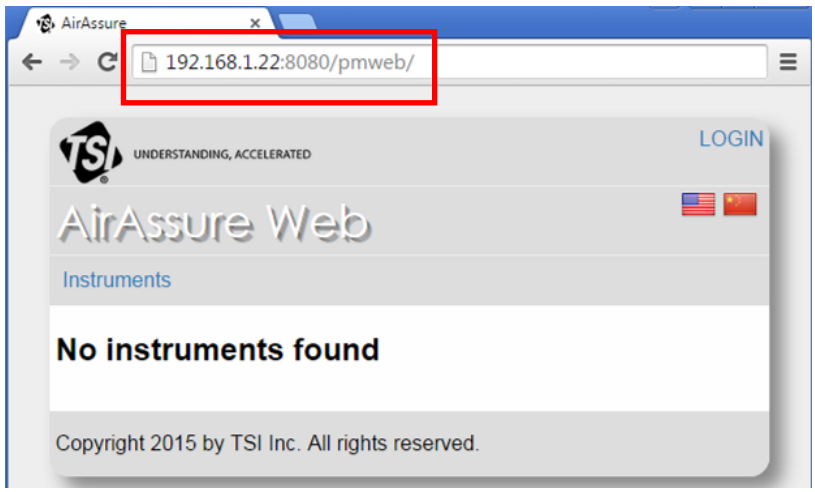
7. Click on the **/pmweb** link in the application manager to navigate to this application.



8. When you first open the web page, there will be no instruments listed unless you have already configured each of the monitors.



9. From step 6 above, reference the IP address of the Tomcat server and replace the test “localhost” with the IP you recorded (such as 192.168.11.22. The address should now read something like: http://192.168.11.22:8080/pmweb/ Once the monitors have been configured properly, this is the address to use for users to view readings from the monitors.



The next step is to configure each of the AirAssure monitors with the IP address of the Tomcat server so they know where to send data to the server. Follow the steps under “AirAssure Monitor IP Configuration” below.

AirAssure Monitor IP Configuration

Each AirAssure monitor must be configured to communicate with the AirAssure Web application before data will be available on the web pages. After the web application service is installed, the monitor is ready for connection to a network.

Note

Each monitor is configured from the factory to get an IP address from a DHCP server on the network. This is how most networks are configured. If this is not the case, the monitor must be connected using the internal USB connector and *AirAssure Configuration Manager* software (see Chapter 6) to override DHCP with a fixed IP address. Please contact your IT department for help in this case.

1. Connect power and an Ethernet cable into the monitor's ports as shown below. The computer with the Tomcat server must be on the same network as the AirAssure monitors. See the sections above for configuring Java® and the Tomcat server.

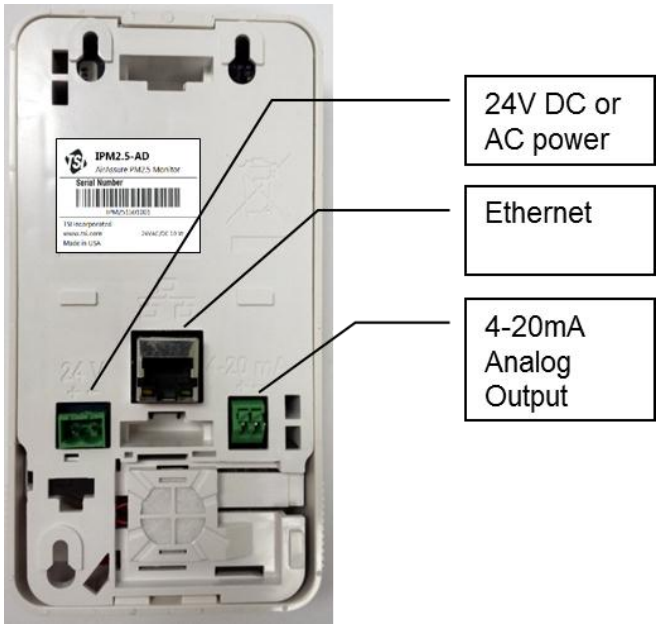
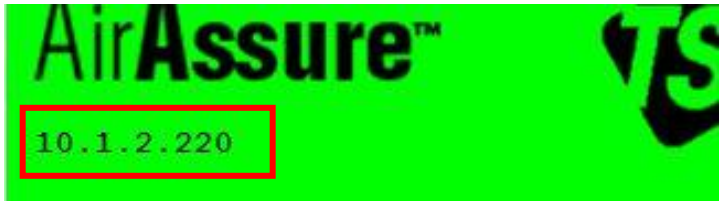
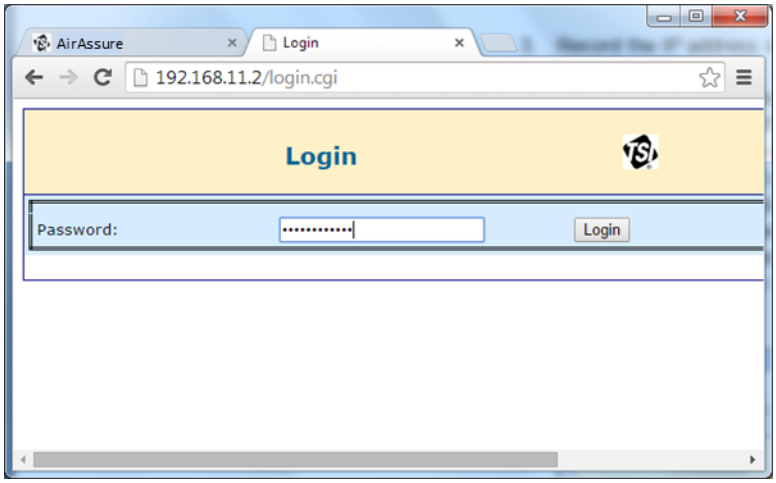


Figure 7-1
AirAssure Back Panel

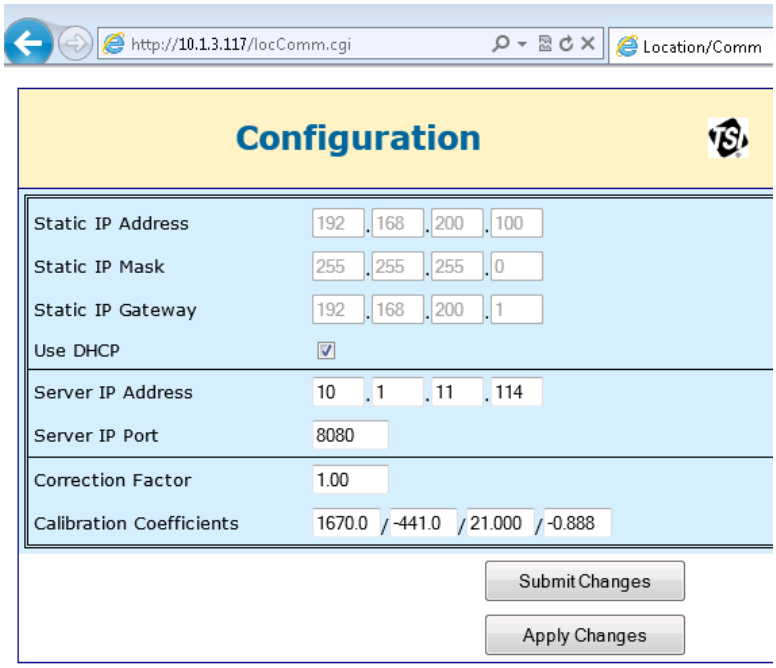
2. After a valid connection is located from a DHCP server, an assigned IP address displays on the monitor's screen.



3. Record the IP address in the table at the end of Chapter 3 for each monitor.
4. On a computer connected to the same network, open a web browser and enter the IP address of the monitor as it appears on the display screen of the device.
5. A password screen will open like the one below. Please refer to the table at the end of Chapter 3 for the serial number of each instrument that you recorded during installation. **Enter the serial number as the password** from the label on the back panel or table (e.g. IPM251501002) and click the “Login” button.



6. The configuration page should now be displayed as shown below. If the screen does not appear, please contact local IT support to see if your computer has access to the network.



7. Generally, the only information that has to change at this point is the server IP address for the Tomcat server configured earlier in the chapter and entered in step 6 under "Apache Tomcat Application Manager Interface" above.

N o t e

The top section of the configuration web page is only used when overriding DHCP and entering a static IP address. If this is the case, please contact your IT department for help.

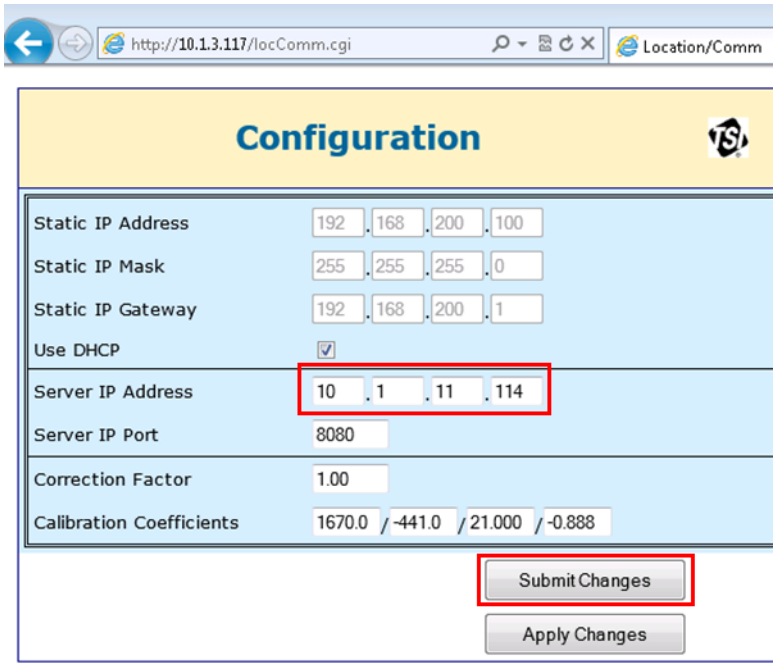
N o t e

If you turn off DHCP and enter a static IP address and click **Submit changes**, the monitor cannot be reconfigured without connecting to a network that will provide the given static IP address. If the address is inadvertently changed, you can use *AirAssure Configuration Manager* to re-enable DHCP over USB. See Chapter 6 for details on using *AirAssure Configuration Manager.*

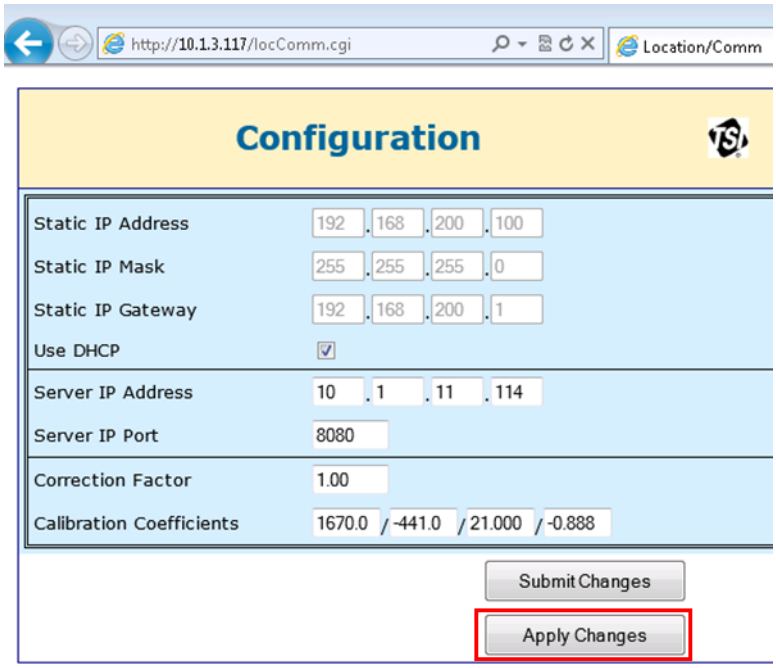
N o t e

The bottom section of the configuration web page provides information on calibration coefficients for a replacement internal sensor. This is only edited during service or when the calibration factor is updated by an administrator.

8. Enter the Tomcat™ Server IP address and click **Submit Changes**.


http://10.1.3.117/locComm.cgi
Location/Comm
Configuration
Static IP Address 192 . 168 . 200 . 100
Static IP Mask 255 . 255 . 255 . 0
Static IP Gateway 192 . 168 . 200 . 1
Use DHCP
Server IP Address 10 . 1 . 11 . 114
Server IP Port 8080
Correction Factor 1.00
Calibration Coefficients 1670.0 / -441.0 / 21.000 / -0.888
Submit Changes
Apply Changes

9. To reset the Server IP address, the monitor has to be power-cycled. Click the **Apply Changes** button in the webpage to reboot the microprocessor.

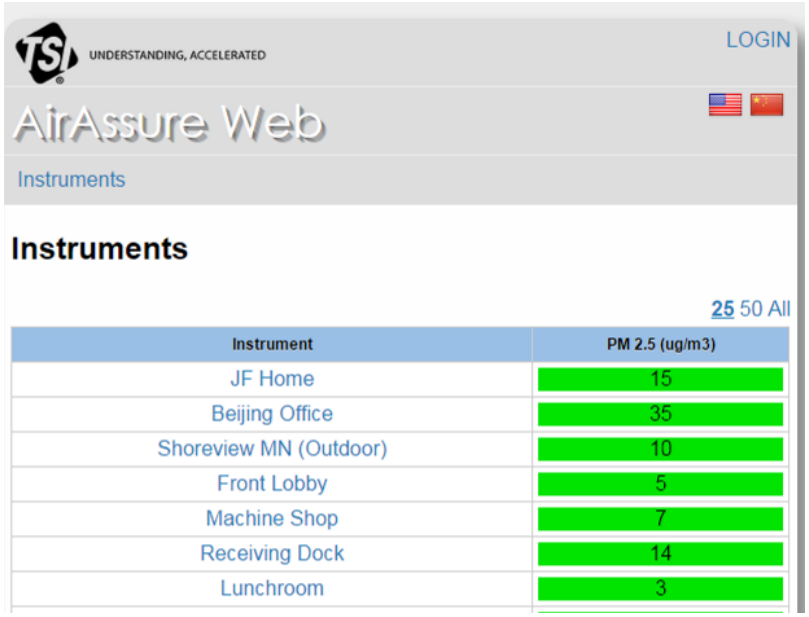


N o t e

There is a Reset push button on the circuit board of the unit, to the right of the display. This can be used to reset the unit without removing it from the wall, in cases where there is no access to the web page or to *AirAssure Configuration Manager*.

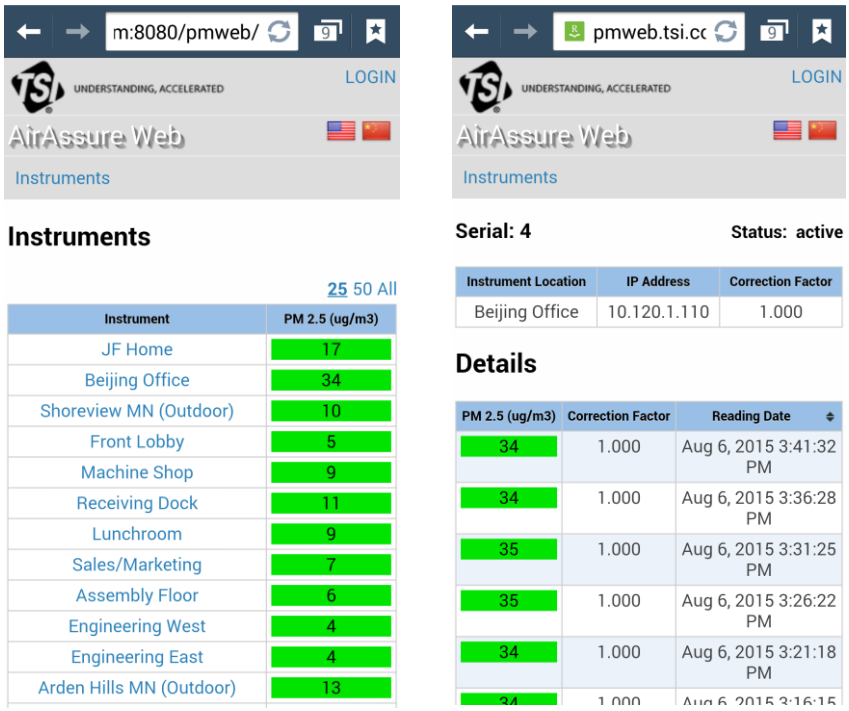
10. Repeat steps 1 to 9 above for each of the monitors configured.

11. Allow five (5) minutes for each sensor to show up if it has just been configured. Re-open the AirAssure Web Application or refresh it if it is already open. Each sensor should now appear in the Instrument column of the AirAssure Web page.



12. By logging in as administrator, you can click on each instrument listed and enter a more meaningful description/location based on your notes from the table in Chapter 3. More information on the AirAssure Web application is in the following chapter.

13. If a phone or tablet is on the same network, it can also access the web app with the same address.



14. If the monitors do not show up on the web page, please see the Troubleshooting section at the end of Chapter 9.

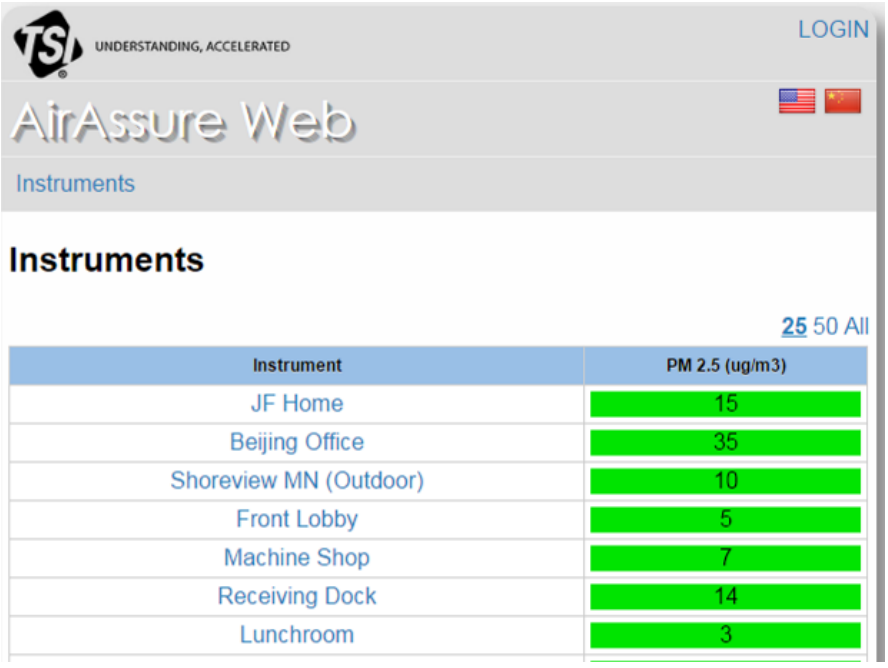
CHAPTER 8

Using the Web Application

The AirAssure monitor sends data readings to the web application once every five (5) minutes. The application can support up to 99 devices at any given time. The web application displays up to 24 hours of data points. Historical data can be downloaded and imported into a spreadsheet program such as Microsoft Excel® spreadsheet program for offline analysis.

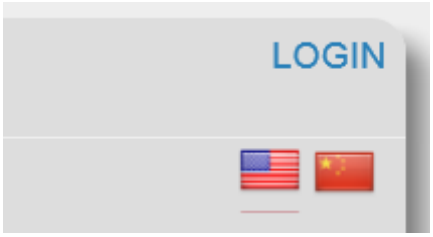
AirAssure Web Main Page Functions

The main page of AirAssure Web is located at http://[IPADDRESS]:8080/pmweb/, where [IPADDRESS] is the IP address of the server. The main page of AirAssure Web shows all AirAssure units set up on the network.



Language

The webpage can be displayed using either English or Chinese (simplified Mandarin). The language selection is made by clicking on the respective flag icons in the upper right-hand corner of the web application.

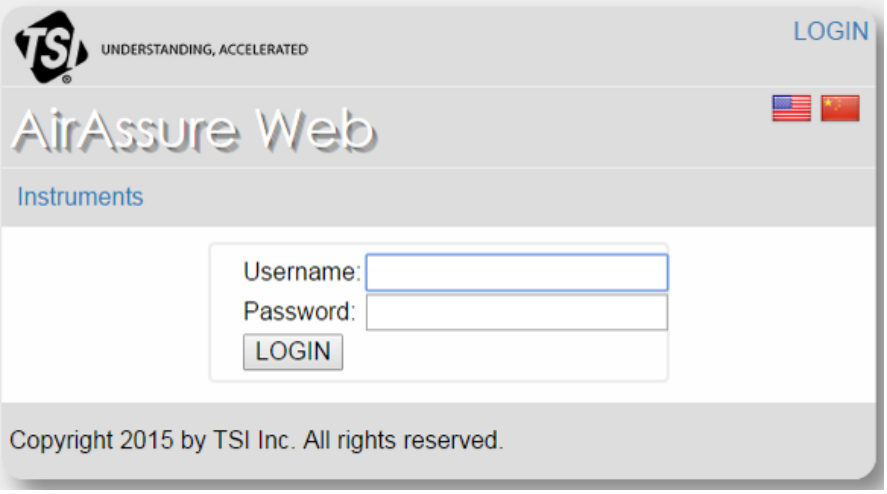


Shown below is a web page in Chinese. Note that Chinese characters can also be entered in the “Instrument Location” field in the single-unit configuration view, although shown in English below.

Logging In

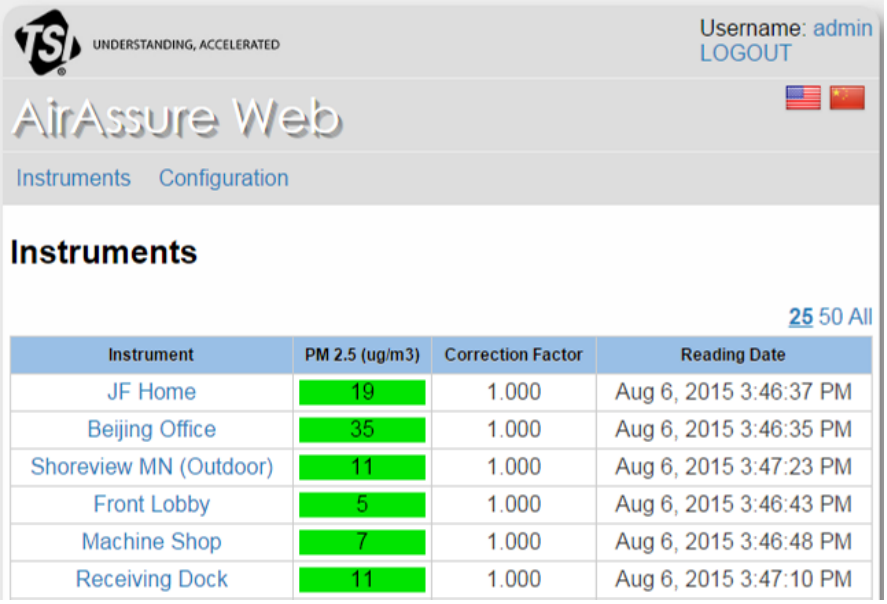
The administrator can log in to access single-unit and multi-unit configuration options. Follow these steps to log in as the administrator:

1. Click **LOGIN** in the upper right-hand corner of the web application.
2. Enter the administrator username and password, defined during set up of Apache Tomcat™ (Chapter 7).



3. Press **LOGIN** to proceed.

Once you are logged in, you return to the AirAssure Web main screen. Now the Configuration tab is visible, along with the correction factor and latest reading timestamp for each device on the network.

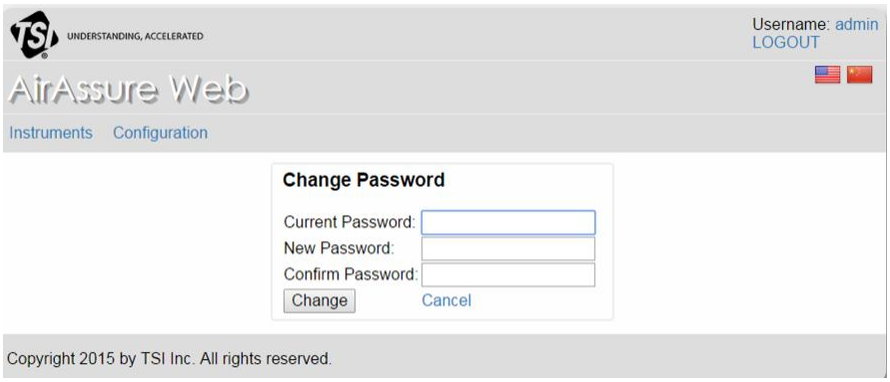


Instrument	PM 2.5 (ug/m3)	Correction Factor	Reading Date
JF Home	19	1.000	Aug 6, 2015 3:46:37 PM
Beijing Office	35	1.000	Aug 6, 2015 3:46:35 PM
Shoreview MN (Outdoor)	11	1.000	Aug 6, 2015 3:47:23 PM
Front Lobby	5	1.000	Aug 6, 2015 3:46:43 PM
Machine Shop	7	1.000	Aug 6, 2015 3:46:48 PM
Receiving Dock	11	1.000	Aug 6, 2015 3:47:10 PM

Changing the Password

To change password of the user currently logged into AirAssure Web monitor, follow these steps:

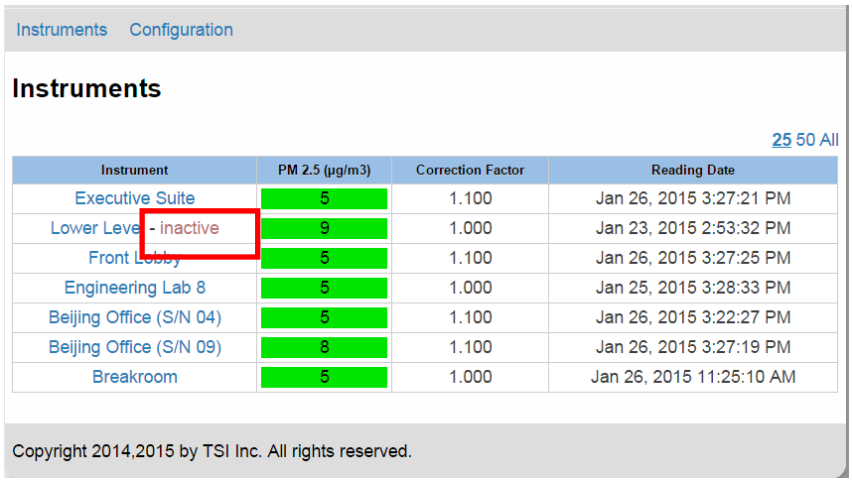
1. In the top right corner of the web application, click on ”**admin**”.
2. At the Change Password window, enter the Current Password, enter a New Password, and re-enter to confirm the new password.
3. Click the **Change** button to accept new password.



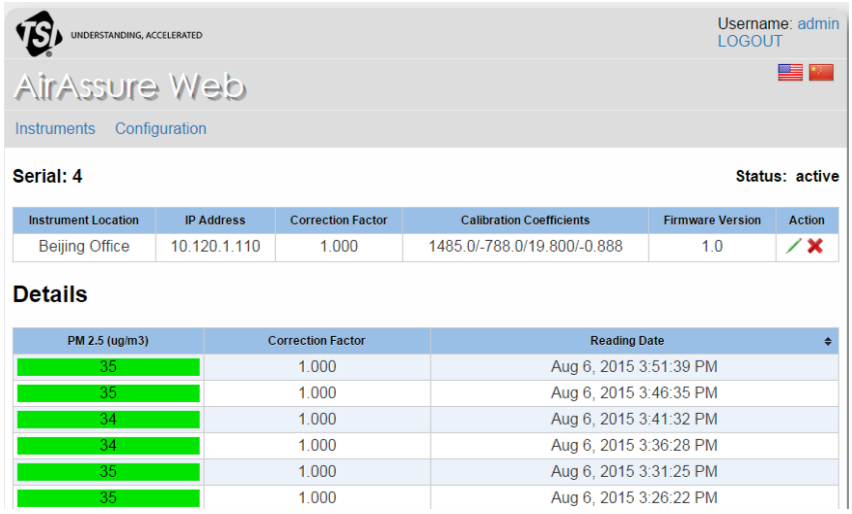
View Data

Data received from AirAssure monitors on the network is available for viewing by all users. It is displayed on the main page of the AirAssure Web application.

1. A monitor is identified by its location in the Instruments column.
   - An active status indicates the monitor is actively communicating with the web application
   - An inactive status indicates application has not received data from the unit in the past 5 minutes
2. The concentration (in µg/m^3) measured by the monitor is displayed, along with its correlating AQI color code.


Instruments Configuration
Instruments
25 50 All
Instrument | PM 2.5 (µg/m3) | Correction Factor | Reading Date
Executive Suite | 5 | 1.100 | Jan 26, 2015 3:27:21 PM
Lower Leve - inactive | 9 | 1.000 | Jan 23, 2015 2:53:32 PM
Front Lobby | 5 | 1.100 | Jan 26, 2015 3:27:25 PM
Engineering Lab 8 | 5 | 1.000 | Jan 25, 2015 3:28:33 PM
Beijing Office (S/N 04) | 5 | 1.100 | Jan 26, 2015 3:22:27 PM
Beijing Office (S/N 09) | 8 | 1.100 | Jan 26, 2015 3:27:19 PM
Breakroom | 5 | 1.000 | Jan 26, 2015 11:25:10 AM
Copyright 2014,2015 by TSI Inc. All rights reserved.

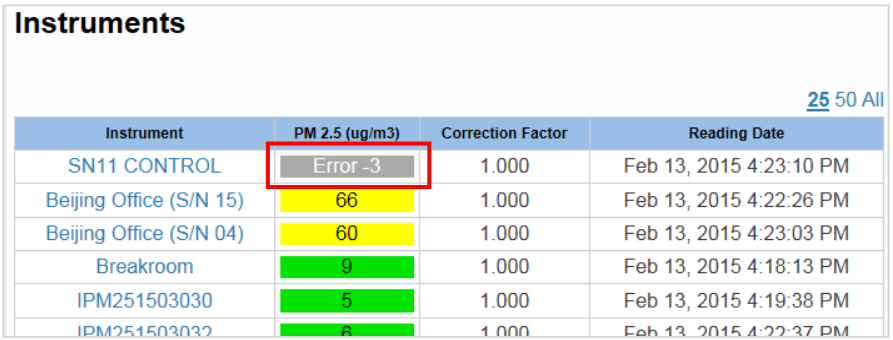
3. Click on a specific instrument location to display monitor details, including location, IP address, correction factor value, and most recent readings.


UNDERSTANDING, ACCELERATED
Username: admin
LOGOUT
AirAssure Web
Instruments Configuration
Serial: 4
Status: active
Instrument Location | IP Address | Correction Factor | Calibration Coefficients | Firmware Version | Action
Beijing Office | 10.120.1.110 | 1.000 | 1485.0/-788.0/19.800/-0.888 | 1.0
Details
PM 2.5 (ug/m3) | Correction Factor | Reading Date
35 | 1.000 | Aug 6, 2015 3:51:39 PM
35 | 1.000 | Aug 6, 2015 3:46:35 PM
34 | 1.000 | Aug 6, 2015 3:41:32 PM
34 | 1.000 | Aug 6, 2015 3:36:28 PM
35 | 1.000 | Aug 6, 2015 3:31:25 PM
35 | 1.000 | Aug 6, 2015 3:26:22 PM

Note

AirAssure Web monitor is only updated with the most recent data when the webpage is reloaded. Therefore, to always view the most recent data, the browser must be refreshed. For automated display of real-time data, third-party applications for auto-refreshing web pages can be utilized.

4. If the unit is reporting an error, then the color code will be gray and the reading will indicate the error code, which appears as a negative number.



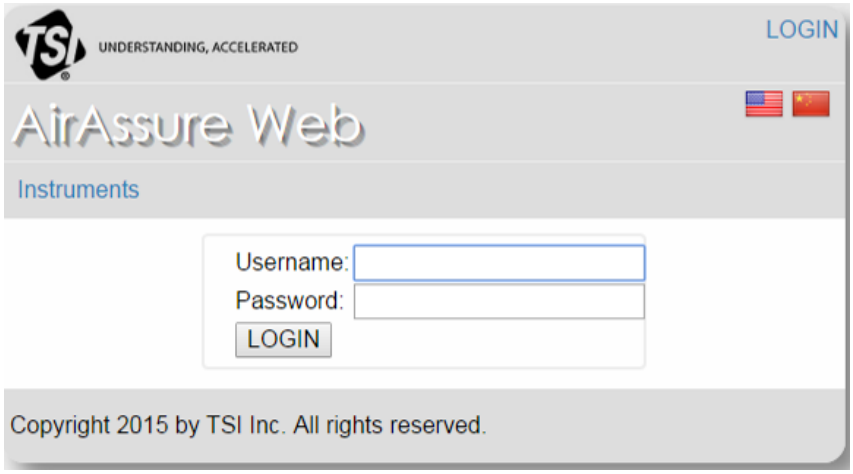
See the Troubleshooting section of this manual for details and suggested actions regarding specific error conditions.

Single-Unit Configuration (Administrator)

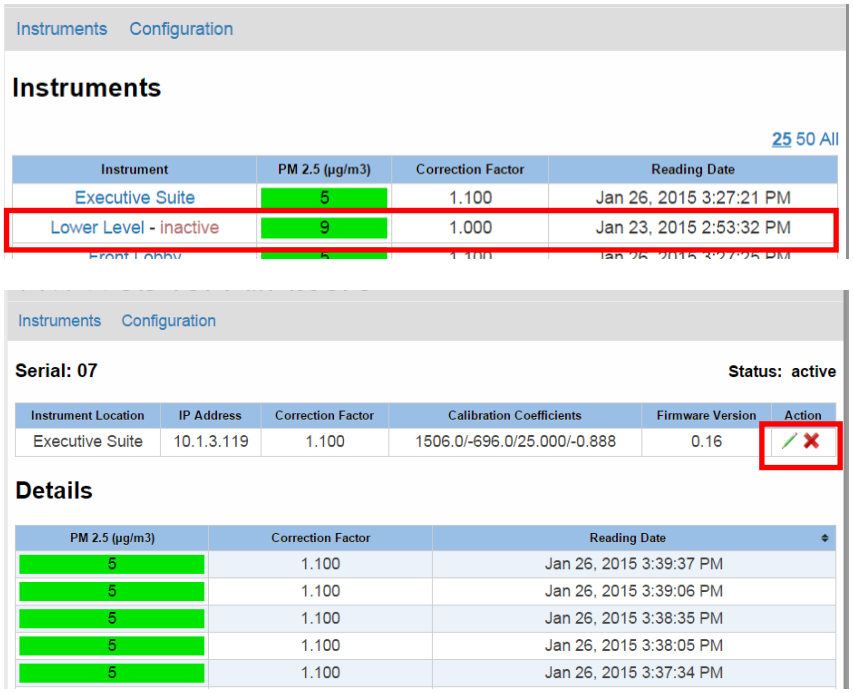
An administrator can set up individual units from the single-unit configuration screen. Configuration changes can include changing the device name or location, correction factor, and calibration coefficients.

Follow these directions to configure individual devices:

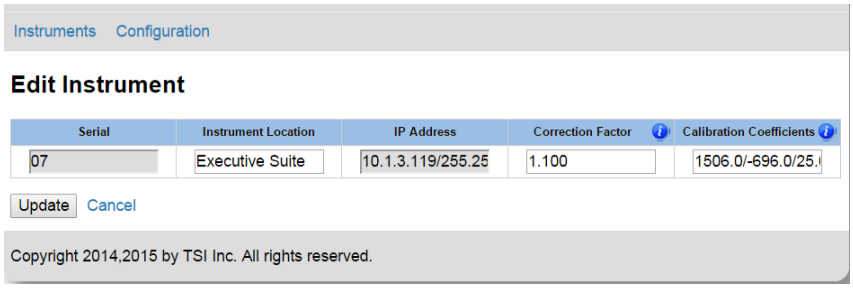
1. Log in as the administrator using the administrator username and password, defined during setup of Apache Tomcat™ (Chapter 7):



2. From the main page, click on a specific instrument location to display monitor details, including location, IP address, correction factor value, and most recent readings.



3. Admin users can configure( ) individual devices on AirAssure Web monitor. Shown below is the individual configuration screen.



Serial	Serial number of the monitor. Not editable.
Instrument Location	Enter device location. This will appear as the instrument name on the main page
IP Address	IP Address of the sensor. Editable from the unit webpage, but not editable from AirAssure Web.
Correction Factor	Used to adjust the reading to agree with a known reference device. For example, if the meter is reading 100 µg/m^3 and the actual concentration is known to be 110 µg/m^3, the correction factor can be changed from 1.000 to 1.100 to multiply all future readings by 1.1. Note that the correction factor can also be changed on the unit webpage.
Calibration Coefficients	These are only modified when a new sensor element is installed (see Chapter 9). Although typically set up on the device webpage (Chapter 7), they can also be entered here. Note that the four coefficients must be separated by a forward slash (/) when entered.

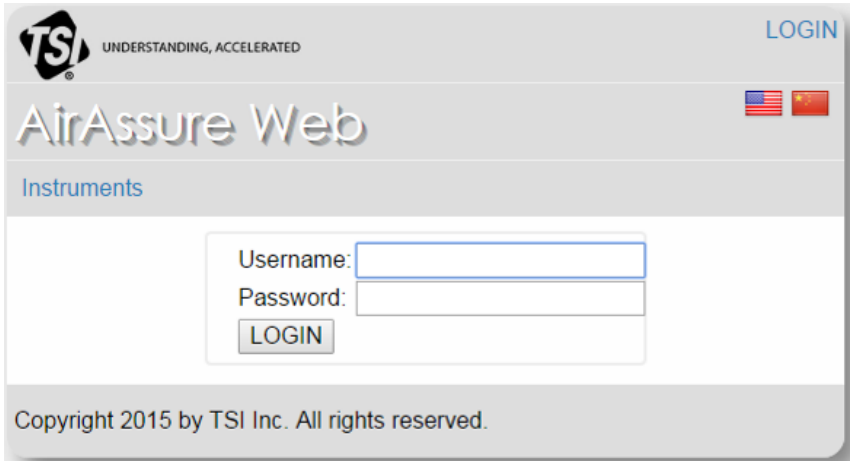
4. Admin users can delete (✖) individual devices on AirAssure Web. This might be necessary if a monitor has been removed from the network.

C a u t i o n
If a unit is deleted (✖) from AirAssure Web then the data records of the unit are deleted also. If you wish to keep data records from the unit, use the export data feature on the Configuration screen to export all AirAssure Web data, before deleting the unit.

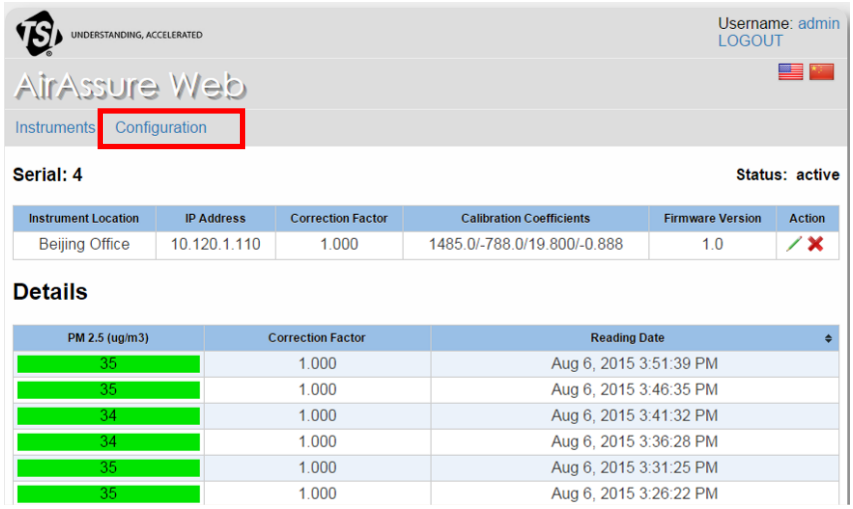
Multi-Unit Configuration (Administrator)

An administrator has access to the Configuration screen, which has configuration options for the overall network. Follow these directions to access the configuration screen:

1. Log in as the administrator using the administrator username and password, defined during setup of Apache Tomcat™ (Chapter 7):



2. From the main page, click on the **Configuration** tab.



3. Here global changes can be made to all sensors on the network, and AirAssure Web data can be exported and cleared.

Global Correction Factor	Use this feature to set all units on AirAssure Web to a common correction factor.
Sensor Records on Page	Use this feature to set the number of sensor records displayed on all individual unit pages. Up to 24 hours of data (288 records) can be displayed.
Update	Update AirAssure Web with updates to the global correction factor and/or sensor records on page.
Export AirAssure Web Data as .csv	When **Export AirAssure Web Data as .csv** is clicked, all AirAssure Web data will be exported in a .csv format. In this format, data can be opened in a spreadsheet for offline analysis. The file size may be large, depending on the length of time AirAssure Web has been running and the number of units on your network.
Clear AirAssure Web Data	To keep file sizes manageable, it is recommended that AirAssure Web data be archived and cleared at least once per year. To clear AirAssure Web Data, click **Clear AirAssure Web Data.** Data records for all sensors will be cleared and will no longer be available for viewing or export.

CHAPTER 9

Maintenance and Troubleshooting

This chapter describes recommended maintenance procedures for the AirAssure™ monitor and is intended for use by a trained service technician. The frequency of routine maintenance procedures depends upon the frequency of use of the instrument and the operating conditions. If contacting TSI for assistance, please have the AirAssure™ monitor close to the telephone when discussing the problem with a TSI technician.

Table 9-1
AirAssure Monitor Replacement Part Kits

Qty.	Part Number	Description
1	IPM2.5-Sens	Calibrated replacement sensor element
1	IPM2.5-Kit	Replacement pump, fan, and filter kit

WARNING

Service and Maintenance procedures described in this section should only be performed by a qualified, trained service technician.

Device Maintenance

Sensor Element Replacement

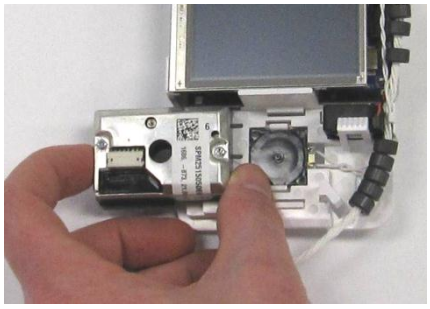
Replacement of the internal sensor element is recommended annually in order to avoid degradation effects. Calibrated sensor element service kit IPM2.5-SENS is available for purchase from TSI Incorporated.

1. To replace the sensor element, first remove the cover of the monitor. Remove the cover by pressing fingers firmly on the bottom of device cover, squeeze, and pull outwards.

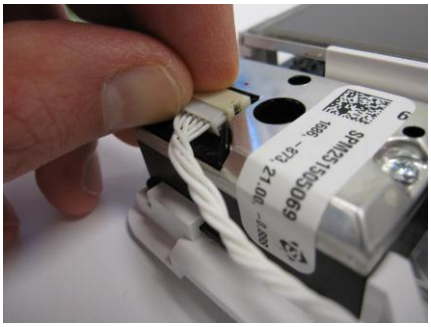
2. Power down the unit, either by powering down the building circuit or by removing the unit from the wall and unplugging power (as shown). If you remove the unit from the wall, it may be necessary to loosen the mounting screws.

3. To remove the sensor element, grip the 6-pin cable between thumb and forefinger underneath connector and pull to disconnect.

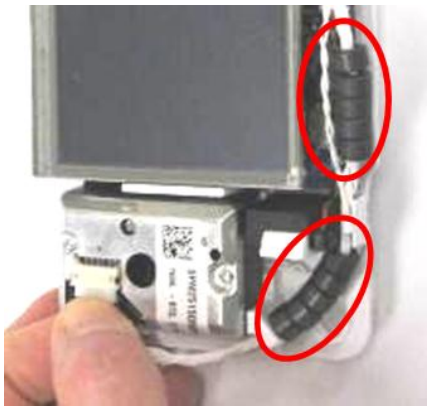
4. Press on the white tab to the left of the sensor and slide sensor outward to remove. Discard sensor.



5. Slide the new sensor into position until it snaps into place secured by the white tab.
6. Attach 6-pin cable to sensor.

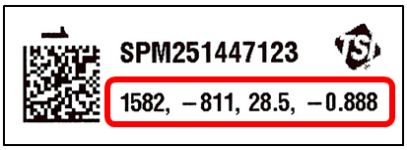


7. To prevent the cable from getting pinched by the cover, position the ferrites (gray beads) between cable guides as shown. There should be five (5) ferrites above the fan and five (5) below the fan.



8. Place sensor cable underneath the cable guide.

9. Take note of the new sensor label that identifies the four calibration coefficients. These coefficients must be programmed into the monitor after powering back on.

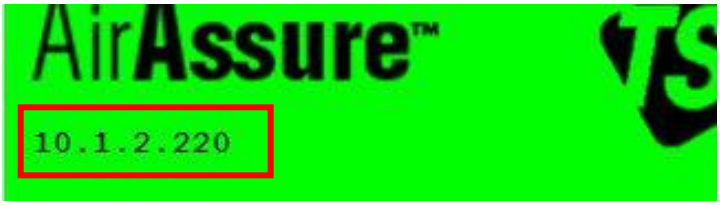


10. The monitor is ready for reinstallation. Re-connect all cable connections.
11. Slide unit back onto wall. Tighten mounting screws.

12. Place cover on by placing cover over the display and snapping the bottom of the cover into the base.

13. After powering on, confirm a successful installation. Listen for three (3) “chirps” of the pump and verify that no error codes are shown on the display within 30 seconds of power-up.

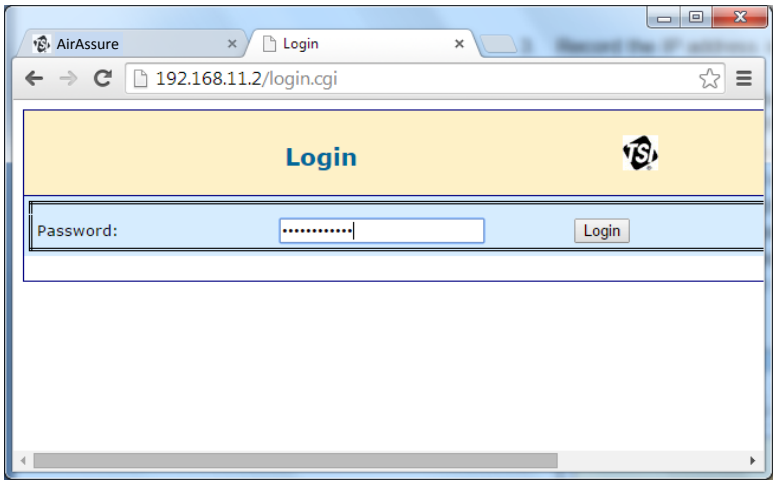
14. Verify that the IP address displays on the monitor’s screen.



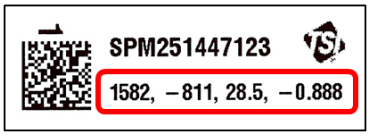
N o t e

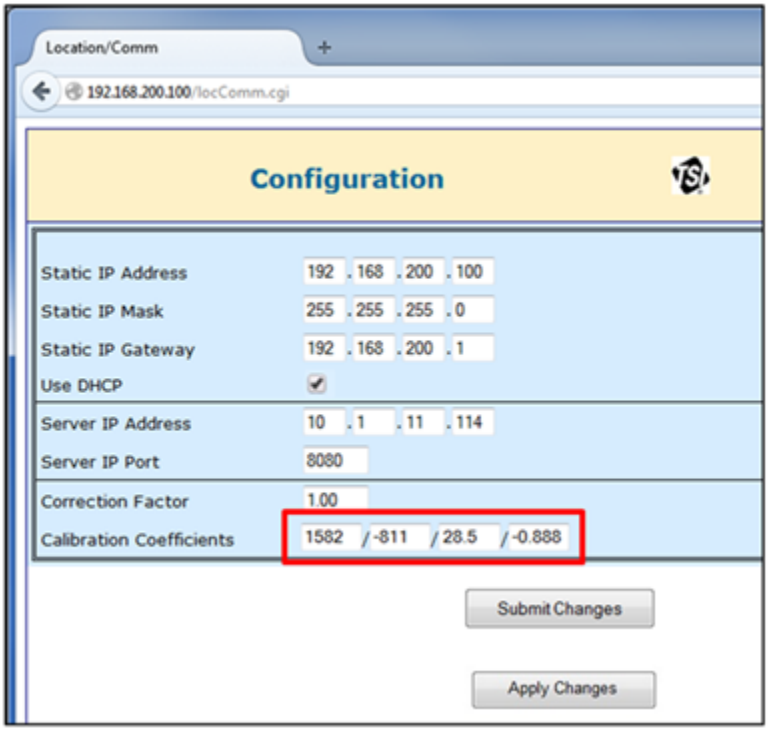
An IP address will not appear on the screen of the monitor if an active Ethernet cable is not connected to the device. Please refer to instructions in Chapter 6 Analog Output for configuring a monitor without Ethernet.

15. On a computer connected to the same network, open a web browser and enter the IP address of the monitor as it appears on the display screen of the device.
16. A password screen will open like the one below. **Enter the serial number as the password** from the label on the back panel or table (e.g. IPM251501002) and click the “Login” button.



17. From step 9, enter the four calibration coefficients recorded from the label on the replacement sensor element and click “**Submit Changes**”.





N o t e

Alternatively, the sensor calibration coefficients can be updated using *AirAssure Configuration Manager* (Chapter 6) or TSI AirAssure Web application (Chapter 8).

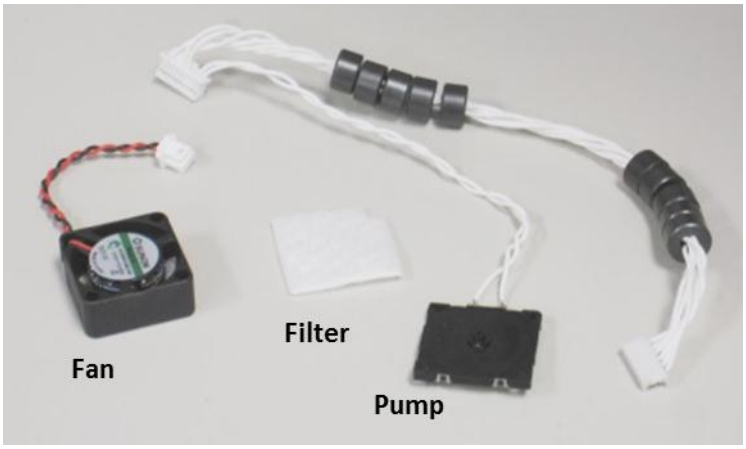
18. Allow the unit to warm up and run for a couple of hours and then check that the readings look reasonable. If not, consult the Troubleshooting section at the end of this chapter.

N o t e

Error code "**-2"** may appear during for the first 8 hours of operation after changing the sensor element. This is not a problem, as it indicates that the monitor has detected a shift in calibration parameters. However if the **"-2"** error code does not go away after 8 hours, check the troubleshooting section at the end of this chapter for possible solutions.

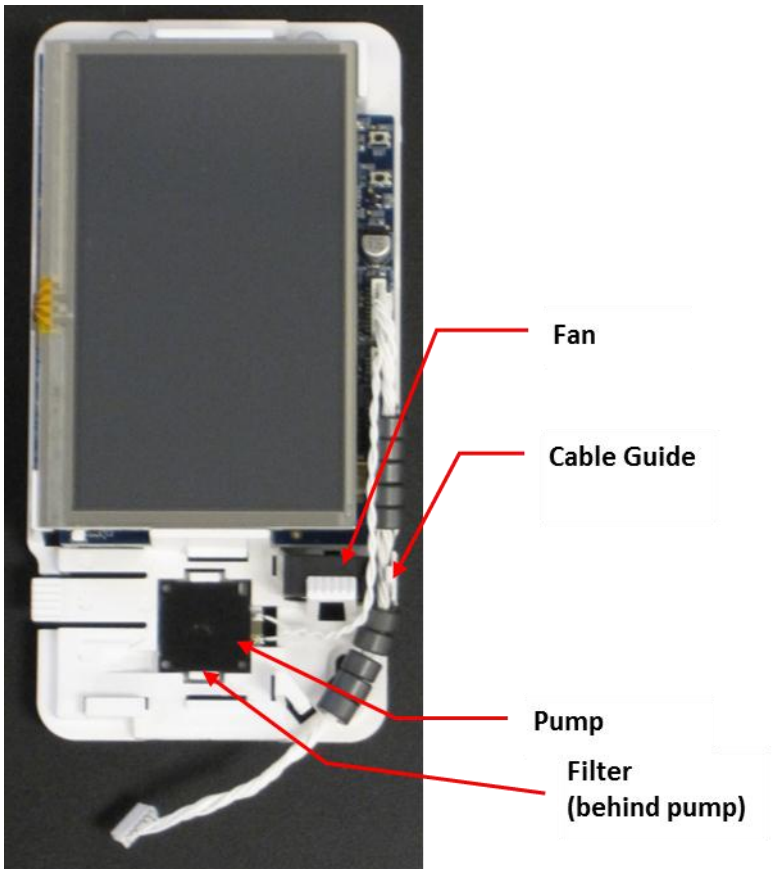
Pump, Filter, Fan Replacement

Periodic replacement of pump, filter, and fan may be required for optimum performance. Review the Troubleshooting section at the end of this chapter for situations when the pump/filter assembly or fan should be replaced.

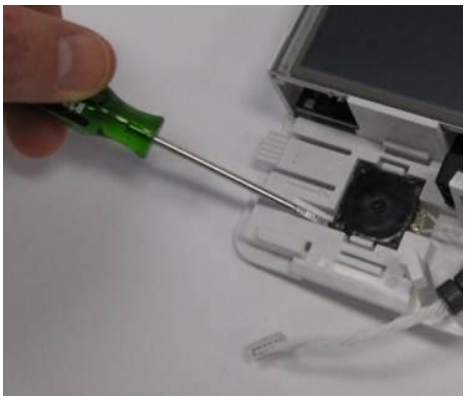


Service kit IPM2.5-KIT includes a replacement pump, filter, and fan, and is available for purchase from TSI. To service these components, follow the directions below:

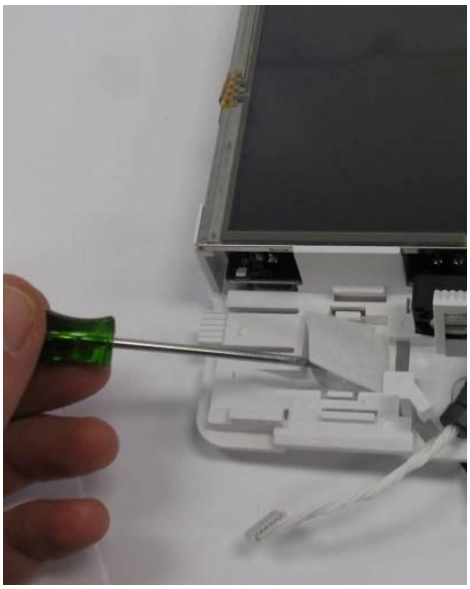
1. Remove unit from wall, unplug power, and remove sensor element. See previous section for details.
2. Locate the pump, filter, and fan near the bottom of the device. The pump rests on top of the filter, held in place with tabs.



3. Use a small, flathead screwdriver and insert behind the pump to carefully snap out.
4. Move pump away from the area to expose the filter underneath.

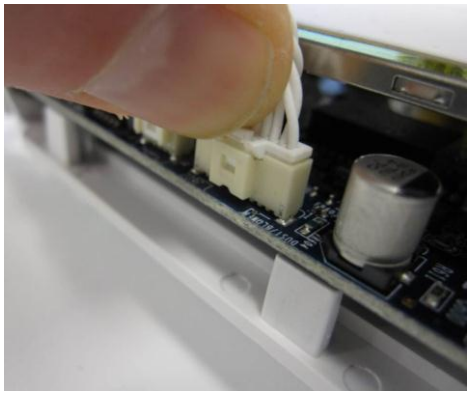


5. Place the screwdriver behind the filter and push upward to remove. Discard filter.



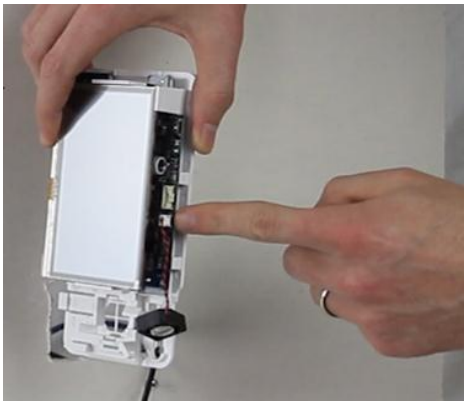
6. Remove cables from the cable guide.

7. Disconnect the pump cable from the main board by pushing on the connector tab. Discard pump and cable assembly.



8. Remove the fan by pressing down on the retainer tab and pulling the fan out of the fan slot. A flathead screwdriver can be used from the opposite side (bottom of device) to help push fan out of the fan slot.

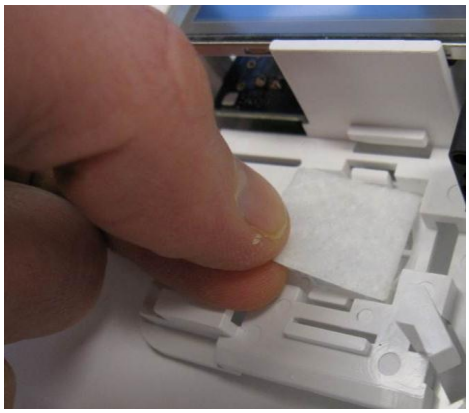
9. Remove the fan connector from the circuit board by pushing on the connector tab. Discard fan.



10. Connect new fan into the circuit board (4-pin connector).

11. To place fan in correct position, the arrow on the fan housing should point downward (away from the display). The fan should be oriented such that arrows are at the bottom of the fan slot.
12. Snap fan into place until the tab is securing the fan.

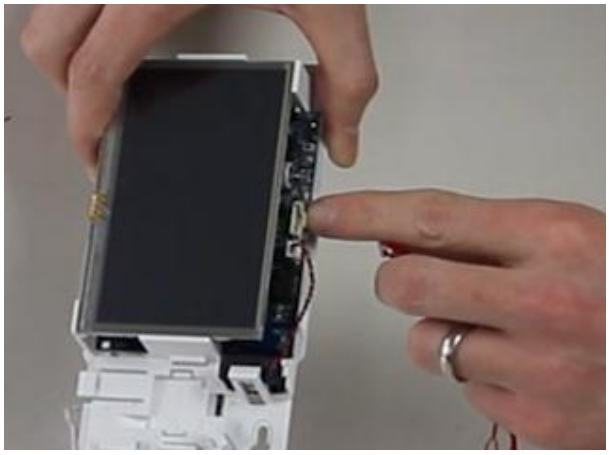
13. Place filter into the cavity.



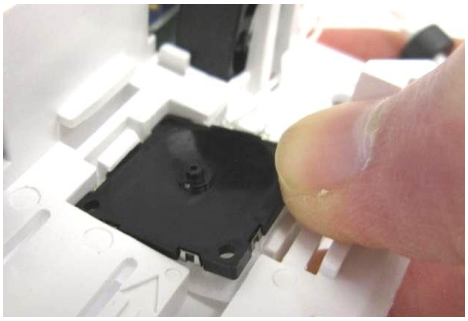
C a u t i o n

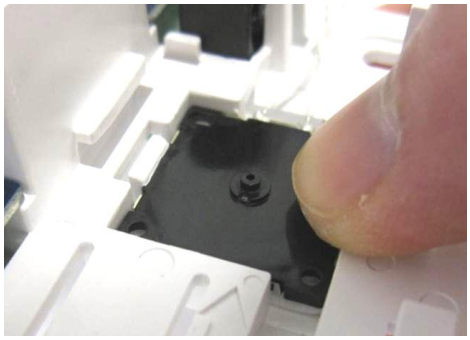
Do **not** forget to install the filter. If the pump is installed without the filter, the unit will not make accurate measurements.

14. Connect the new pump into the 10-pin connector on the circuit board.

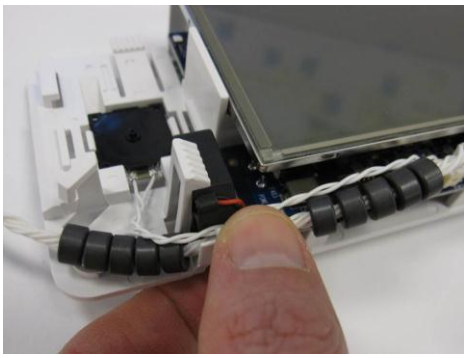


15. Place the pump into place resting on filter by sliding under the top tab and pushing down on the bottom tab, until it snaps into place. Avoid pressing on the center of the pump.

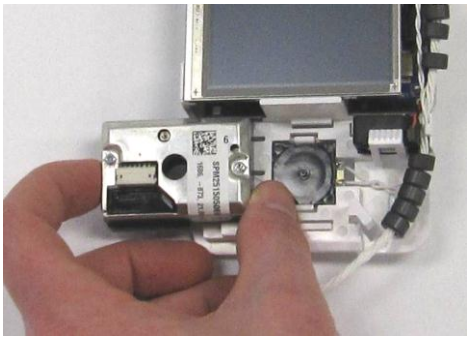




16. Position the ferrites (gray beads) between cable guide as shown. There should be five (5) ferrites above the fan and five (5) ferrites below the fan.
17. Secure cables into the cable guide to avoid pinching cables by the cover.



18. Slide the sensor into position until it snaps into place secured by the white tab.



19. Attach 6-pin cable to sensor.
20. To avoid pinching the cable when installing the cover, verify that there are five (5) ferrite beads above the fan and five (5) below the fan as shown. Reposition if necessary.

21. Place sensor cable underneath cable guide.

22. The monitor is ready for reinstallation. Re-connect all cable connections.
23. Slide unit back onto the wall. Tighten mounting screws.

24. Place cover over the mounted display and snap the bottom of the cover to the base.

25. After powering on, confirm a successful installation. Listen for three (3) “chirps” of the pump and verify that no error codes are shown on the display within 30 seconds of power-up.

Upgrading Firmware

Check the TSI website periodically for upgrades to IPM2.5-AD firmware. Firmware upgrades will be available for download.

To determine whether a IPM2.5-AD firmware upgrade is available, follow these instructions:

1. Open the TSI website at www.tsi.com.
2. From the **Support** tab > **TSI Software and Firmware** > **Software and Firmware Wizard.**
3. Follow the onscreen instructions to locate firmware for the AirAssure™ IPM2.5-AD monitor.

If firmware is found online by the Software and Firmware Wizard and you want to install it onto your monitor, follow these instructions:

1. Before running the firmware installer, you must connect USB. To access the USB connector, remove the cover of the monitor by pressing fingers firmly on bottom of device cover, squeeze, and pull outwards.

2. Connect the unit to your personal computer using a Micro USB cable (not provided). The USB connector is on the left-hand side of the device.

Caution

Use caution when plugging in cable, as excessive perpendicular force may damage the connection.

4. Download the firmware from the Software and Firmware Wizard (see previous steps).
5. Launch the application. It may be necessary to select the COM port connected to the IPM2.5-AD AirAssure™ monitor.
6. Click "**Update Firmware**".
7. Allow process to complete, following onscreen prompts. The duration of the update is 5 to 7 minutes.

Troubleshooting

The table below provides basic information about instrument problems and suggestions for corrective action.

Table 9-1
Troubleshooting

Problem	Cause	Suggested Action
Monitor does not power up (blank screen)	No power to the sensor	Check with a voltmeter that the connector is providing either 24 VAC or VDC power.
	Incorrect wiring	Verify that the 24 VAC or VDC is wired into the "24V" connector, and not into the "4-20 mA" connector.
	Power connector not seated properly	Make sure the green power connector is seated firmly in the socket in the monitor back panel.
	Screen or circuit board damaged	If the power is supplied to the unit, when the cover is removed, there should be a green pulsing LED on the upper left of the circuit board. If not, then there may still be a problem with the power, or the circuit board may be damaged. If the LED is pulsing but the screen is blank, the screen may be damaged. In either case, the monitor must be returned to the factory or replaced.

Problem	Cause	Suggested Action
Display shows unusual numbers	Display shows <5 or >300	This is normal. <5 indicates a concentration of "less than" 5 µg/m^3 due to the limited resolution of the monitor. Likewise, >300 indicates a concentration "greater than" 300 µg/m^3.
	Display shows -1, -2 or -3	This indicates an error condition. -1 indicates a sensor element error. Check for a damaged sensor or disconnected cable. Replace if needed. -2 indicates an auto zero error. This could be caused by the pump not turning on, filter not inserted, or a leak around the filter. If you have replaced the pump/filter, check that they are installed correctly. If not, replace the pump, filter and cable assembly. -3 indicates a fan error. The fan may be faulty or disconnected. Check or replace the fan.
	Display shows -2 frequently	If the -2 error occurs more than once per year, it might indicate that the installation environment has sources of random high EMF (electromagnetic field) which is affecting sensor accuracy.
Display shows numbers that I know are consistently much too low or too high compared to a reference device	Monitor seems too high or low compared to a reference device	Depending on the instrument, the readings over a short period may be significantly different. However, over an averaged time period of 24 hours for a week, the monitors should compare well against a high-quality reference instrument such as a TSI DustTrak Aerosol Monitor. Also, sources can be very local. Make sure the measurements are located very close together. The correction factor can be adjusted to weight the reading as necessary to agree with a known reference device. Refer to Chapter 8 for using the correction factor feature.
	Sensor has degraded over time. Reading is too low.	If the sensor element in the monitor is over 1 year old, and the reading is low, the sensor element may have to be replaced. See Device Maintenance section.
	Zero module pump has failed or filter is completely clogged. Reading is too low.	If the zero pump has failed or the filter is clogged, the zero offset will be incorrectly high since it is zeroing with dirty air. When this large number is subtracted, the reading can be incorrectly low. The zero pump and filter element and filter should be replaced. See Device Maintenance section.
	Internal fan has failed. Response time is very slow.	There is a small mixing fan that pulls air from the room into the sensor. If it fails, the response could be slow or erratic to changing air quality levels. Consider replacing the fan. See Device Maintenance section.
	Reading is much too high.	There could be a foreign element (such as large dust or a hair) in the sensor viewing volume. Open the cover and inspect the sensor element. Blow out the center hole with some clean air. If the high reading persists, consider replacing the sensor element. See Device Maintenance section.
	Calibration is incorrect. Reading is too high or low.	If the sensor has been replaced recently, check that the calibration parameters for the sensor element have been entered into the configuration web page for the monitor. Incorrect calibration parameters can cause incorrect readings.
Monitor periodically makes a "hissing" noise	Normal operation of the zero module	The zero module has a pump that can make a "hissing" noise for a few minutes. This is normal. When the monitor is first powered on, it makes a quick three "chirps" or "hisses" to indicate the zero module is operating properly. In normal operation the pump runs 30 minutes after power up and then every 8 hours afterward.

Problem	Cause	Suggested Action
The AirAssure Web application does not show the monitors I've installed	Java® installation, Tomcat installation, AirAssure Web installation or IP configurations incorrect.	The installation of the components required for web-based monitoring are somewhat complex. If this is a first time installation, carefully read the instructions and review all the steps. Install only from the install package from TSI that has been tested. Review the system requirements and compatibility requirements to make sure your hardware, operating system and software are compatible.
	IP configuration of the monitors is incorrect	On the monitor webpage, make sure that "Server IP Address" has the IP address of the server.
	There is a windows or another firewall blocking HTTP traffic on port 8080	Contact your IT department and have them unblock port 8080 on the firewall for the Tomcat server computer. Contact your TSI representative for an application note on this topic.
	Tomcat server IP address has been entered on the monitor web page and submitted but the monitor isn't sending the data	Each monitor has to be power cycled after updating the Tomcat server IP address. If you haven't, please remove and restore the power to the monitor.
	Tomcat server and monitors are not on the same network.	The server and monitor have to be on the same network. If you are using a combination of wired and wireless networks, make sure they are on the same network. Often wireless networks give guest access that blocks access to the wired network. Contact your IT department for assistance.
On AirAssure Web, individual unit calibration parameters are blank	Unit is inactive	Calibration coefficients and correction factor may be blank if the unit is not currently posting data to AirAssure Web
	Unit is in the process of posting data to AirAssure Web	Refresh your browser
When troubleshooting a device over internal USB, I cannot connect multiple units to my personal computer.	Depending on the operating system of your PC, it may not be possible to connect more than one unit to a single computer over USB.	Use Ethernet if you need to monitor multiple units.
Tomcat application does not display in browser during web application installation.	Java install requires computer reboot.	Reboot computer. Make sure Tomcat server is set to start automatically after reboot.

Technical Contacts

If you have technical or application questions, contact an applications engineer at TSI Incorporated.

If the AirAssure monitor fails contact TSI at:

Technical Support

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APPENDIX A

Specifications

This appendix provides specifications for the AirAssure™ Indoor PM2.5 Mass Concentration Monitor, Model IPM2.5-AD which are subject to change without notice.

Sensor Type	Light scattering photometer
Aerosol Concentration Range	5 to 300 µg/m^3
Display Readings	PM2.5 mass concentration and color change to represent Air Quality Index
Screen Resolution	1 µg/m^3 increments
Zero Stability	±10 µg/m^3
Operational Temperature	10 to 30°C
Storage Temperature	-10 to 50°C
Operational Humidity	Less than 65% RH
Time Constant	5 minute trailing average, screen updates every 1 sec
Weight	0.2 kg (0.5 lb), Packaged: 0.5 kg (1.0 lb)
Physical Size Dimensions (HWD) ..... Depth including connector	 16.2 cm x 8.5 cm x 3.3 cm (6.4 in. x 3.4 in. x 1.3 in.) 3.8 cm (1.5 in.)
Communications	• Ethernet • Analog 4-20 mA
Power	24 volt (AC or DC), 5W max
Screen	4.3 in. color LCD display
Calibration	Pre-calibrated sensor element with NIST Statement of Conformance
Language	• English • Simplified Mandarin
Mounting	• Wall mount to drywall • Type 86 gang box • American single gang box
Service	• Local service available • Sensor and some key components are field serviceable

Web App.....	• Ethernet connection • Password protection capability • Data export capability • Supports up to 99 sensors • Compatible with mobile devices • Located on local server • Display measurement on remote screen • Output coordinated to Air Quality Index color rating • Supports any operating system that can run Java Runtime 8 and above
Service Kits.....	• IPM2.5-Sens – Calibrated replacement sensor element • IPM2.5-Kit – Replacement pump, fan, and filter

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